CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

ENERGY EFFICIENCY COMMITTEE

WORKSHOP

INTEGRATED ENERGY POLICY REPORT

ON AIR QUALITY, PUBLIC HEALTH AND ENERGY

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A P P E A R A N C E S

COMMITTEE MEMBERS PRESENT

William J. Keese, Commissioner, Chairman

James D. Boyd, Commissioner, Chairman

STAFF PRESENT

Al Alvarado, Electricity and Natural Gas Report

Eileen Allen, Environmental Protection Office

David F. Abelson, Office of General Counsel

Karen Griffin, Integrated Energy Policy Report

Pierre H. duVair, Ph.D., Climate Change Program

Dale B. Edwards, Environmental Protection Office

John Beyer, PIER Program

Matthew S. Layton, Systems Assessment and
Facilities Siting Division

Gerry Bemis, Transportation Division

Jim McKinney, Environmental Performance Report

ALSO PRESENT

Michael H. Scheible, Air Resources Board

Barbara L. Weller, Ph.D., California Air Resources
Board

M. Beth Schwehr, Air Resources Board

Sayed Sadredim, San Joaquin Valley APCD

Tim Carmichael, Coalition for Clean Air

Larry Hunsaker, Air Resources Board

A P P E A R A N C E S (continued)

ALSO PRESENT (continued)

Beverly Werner, Air Resources Board

Christopher Gallenstein, Air Resources Board

Steve Brisby, California Air Resources Board

Gary Greenwood, Resources Agency

Nehzat Motallebi, Ph.D., Air Resources Board

Stephen E. Doyle, J.D., Clean Energy Systems, Inc.

I N D E X

P R O C E E D I N G S

CHAIRMAN BOYD: Good morning, everybody. Welcome to one in what is becoming a daily, continuing series it seems like to me anyway of workshops. Today is for our Integrated Energy Policy Report. Today is air emissions, public health and energy.

I'm Jim Boyd, the Chairman of the Commission's Integrated Energy Policy Report Committee. I'm joined by Commission Chairman Keese, who is the other member of this committee, and I welcome you all here to discuss this subject today.

The purpose, of course, of this workshop -- like all that have preceded and will follow on varying subjects -- is to receive public comments on subjects. Today's being air emissions on public health and energy, the nexus between Senate Bill 1389, which was authored by Senator Boan, and enacted into law in 2002, requires this Commission to submit an Integrated Energy Policy Report.

And our first report is due to the legislature and the governor November of this year, and as I said, we've had a series of workshops on multiple subjects. Today we're going

to talk about a number of topics that were elaborated in the announcement for you hardy few who read the announcement obviously and are here today to discuss the subject.

To some of us there's a very strong and long-lasting nexus between energy issues and air quality, and air quality is driven by public health. Our purpose is to document that fact for this policy report, and identify policy issues, both for ourselves, the air quality public health community, and for the governor and the legislature.

And with those few introductory remarks, I'll ask Chairman Keese if he'd like to say anything before we turn it over to Eileen and -- or is it Al? Okay, it's Al. You didn't give me a script this time, so I'm winging this. I'll turn it over to Al Alvarado, who I seem to turn most of these over to lately.

CHAIRMAN KEESE: Good morning. I'll just make the one point that we have to come out with recommendations to be adopted by the government. And so, we do the background here, and then we'll convene ourselves to come up with the recommendations.

Anything you can do to help guide us in your comments as to what the recommendations should be in this area is very welcome. Obviously, we have to set the foundation, we have to know where we are. And as Mr. Boyd has pointed out, energy and air are totally tied together.

But we do have to, at the end of the day, come up wit recommendations for this Integrated Energy Policy Report that have to do with air. So help us out as we move through this process. Thank you. Al?

MR. ALVARADO: Good morning. Welcome. This is the third of a series of workshops this month for the Integrated Energy Policy Report. We do have a list of the different proceedings that we're having for this month on different subject areas. My name is Al Alvarado, --.

CHAIRMAN BOYD: Al, I'm interrupting you because you're drifting in and out, which means I have to caution the speakers and audience. You got to look at this thing, you've got to be close to it, you can't stray to the side or it drops you off.

So, Al, you gotta practically eat this microphone as we've learned painfully here.

MR. ALVARADO: Thank you, Commissioner. I guess I should know better after the number of these workshops we've had already. Again, my name is Al Alvarado. I'm the project manager for the Electricity and Natural Gas Report. This is one out of three subsidiary reports that are being prepared in support of the Integrated Energy Policy Report.

The subject of today's workshop will be included in both the electricity and natural gas report as well as the transportation report. The discussion and any technical feedback that we receive in today's workshop and during the next several public events will serve to refine the staff's energy system studies and preparation of these staff draft reports.

The Electricity and Natural Gas Report and Transportation Report, the draft reports, are targeted to be released towards the end of July. We're shooting for July 25th. The technical analysis that will be included in these reports will provide the findings to support the development of policy recommendations that the committee may consider for the preparation of the Integrated Energy Policy Report.

So, we are interested in hearing your views and perspectives on today's subject matter. We are transcribing this workshop to help us track all of your comments. But this will require you to come up and use the microphone we have set up for you. Please identify yourself for the record and give your business card to the Reporter.

This will help identify each of the speakers for the transcripts. So despite this formality I do hope that we can foster a lively and open discussion, since the purpose of this workshop really is to hear from you. We are open to receiving any eventful comments the parties may have resulting from the discussions we have today, and I would suggest filing comments by June 20th or sooner. The sooner the better.

As soon as -- we're really working on a tight schedule, and will be immediately starting to write the draft reports as soon as we have a chance to digest input from this workshop.

So let me introduce Eileen Allen. Ms. Allen is responsible for monitoring this workshop today.

MS. ALLEN: Good morning. Thank you for coming to this workshop. We have a tremendous

amount of information to present today, so at times I will be ruthless with the speakers, urging you to wrap up your powerpoint presentation quickly, and urging you to keep it short.

Our primary intent is to be able to have the presentations be a starting point for public discussion. So repeatedly I will be reminding the speakers that we need to allow time for public discussion.

The workshop is basically set up in three major parts -- an air quality background and current activities that are occurring at the California Air Resources Board and the California Energy Commission in the air quality and health areas. That's called part one.

Part two will be technical presentations on emission trends by the Air Resources Board and Energy Commission staffs.

I've scheduled in a lunch break from 12:30 to 1:15. The idea is that if I put 45 minutes on here then everybody should be back in one hour. So please do try to return as promptly as possible so we can get through the agenda.

After lunch there will be some final presentations wrapping up part two. Part three is

devoted to a comprehensive discussion of greenhouse gases and the trends that we're seeing.

And part four is an opportunity for overall discussion on any of the topics. As far as items associated with the building, there are restrooms to your left and directly across the hall. As far as lunch, we've set out a list with suggestions on places to eat in the area.

I'm sure I'll think of other items as we go through the day, but for now that's all I have to say. We're ready for the first speaker, which is Mike Scheible, the Deputy Executive Officer of the Air Resources Board.

MR. SCHEIBLE: Good morning. Let me apologize starting off, I'm dressed fairly informally today, I just got back from vacation an hour ago from three weeks in South America and learned that Bob Barum (sp), who was going to make the presentation, was sick today. So he delegated it upward to me.

In my career at the Air Resources Board I've been involved in energy issues for quite a long period of time, so it's kind of fun to come here and participate in the workshop and make an overview presentation. Let's see if I have the

system down. Okay.

In terms of where we're at with air pollution in California, we've done a lot but we still have a lot of remaining concerns that will be with us for probably a number of decades.

The major pollutants of concern now are ozone, which occurs in the summertime on hot days; particulate matter, which unfortunately leads to the major health effect that we worry about, which is premature mortality and a lot of other disease increase.

Air toxics, diesel exhaust, and the exhaust from gasoline vehicles are a primary concern. And carbon monoxide is much less of a problem than it used to be, but still we have elevated levels in a couple of areas of southern California.

Twenty years ago things were much, much worse. And we're quite proud of the progress that we've made. Jim Boyd, now responsible for helping solve the energy problems of the state, led the Air Resources Board for quite a long period of time, where he made tremendous progress.

A number of pollutants that were major issues 20 years ago are now at attainment -- lead,

nitrogen dioxide and sulphur dioxide. And the levels of the other pollutants have come down either moderately or very substantially.

Twenty years ago we would have 100 days a year when we would tell children in the south coast you shouldn't go out and play today, mid-day. We haven't had any of those the last couple of years. So, things have improved dramatically, but I don't want that to be misinterpreted as the status quo is acceptable.

This just gives a quick overview, and I think I'll skip it for now. Just a little visual trend here. Here you see the PM10 levels in California, and you can see that there has been progress over the years, and the south part of the state and the San Joaquin Valley have higher levels than the Sacramento Valley or the Bay Area, in large part due to meteorology.

And although the levels have declined, we still have only been able to cut them in half, and we must do much better than that. Air quality has improved, despite the fact that we've had a growth in population, a growth in vehicle travel, a growth in economy, and a growth in energy use.

So we've been able to make progress

despite the fact that the basic factors that result in air pollution have been increasing.

But the technological progress we've been able to make has been eroded by the fact that we have 35 million people now rather than the 20-some million a few years ago, and we have to be cognizant of the fact that in the next 10, 20, 30 years that California' population will probably continue to grow at something close to the rate we've seen recently, or about five million people or so every decade.

So, where are we today? As you can see from the map there's still large areas of the state that Californians breathe unhealthy air for either a few days a year or quite a number of days in the year. Because of this we've got to keep going, we can't be complacent.

What are the major energy-related air quality activities in effect? Energy and air quality are linked directly. If we didn't need energy resources we probably wouldn't have much of an air quality problem.

We would have windblown dust, and we would have some solvents that created air quality problems close to their use, but basically because

we need energy, because we rely on fossil fuels and we have unwanted, incomplete combustion products and by-products of the energy use, we have an air pollution problem in the state.

And we're going to have to work very closely together to address what our energy needs are, and how we accomplish those and mitigate and continue progress on the air quality front.

The first thing we're worried about is health effects. In environmental programs the bulk of the effort in air quality is related to human health-related issues, and the major impact that we concern ourselves about is not ecological but human health, so there is a very direct link there.

We are very involved in forecasting energy use and the way that electricity will be produced and fossil fuels will be used and vehicles will be operated in terms of estimating what the current and future emissions will be.

In terms of constructing new sources of power plants or other energy using sources, we are involved in a permit process and we have to put out guidance for both the technology and how to mitigate the emission from those sources.

We're heavily involved in a program where we deal with vehicle activities both from the fuel side, and ensuring that California uses the cleanest possible mix of fuels, and use those fuels in advanced technology vehicles that emit as little as possible.

We have a new mission now, to deal with global climate change and to deal with the impacts from the vehicle area in terms of reducing emissions from California's light duty vehicle fleet of global climate impacting gases.

And lastly, to continue addressing the problems that we have with particulate matter in ozone primarily.

We have an intense effort going on now to construct a new set of what we call state implementation plans, which are when we look out 10, 15, 20 years in the future and we say what more do we need to do in order to improve air quality.

This pyramid here just shows that it's a large task with lots of different technical elements. We monitor the air routinely, and we have a pretty good idea of what the pollution levels are. We inventory the sources and have

estimates of how the hundreds of thousands of sources in the state contribute to the problem.

We use complex computer modeling, and modeling of the atmosphere and chemistry in the atmosphere to predict pollution impacts and predict what we need to do in order to reduce those to acceptable levels.

We then develop a control plan, and the culmination is a SIP, or State Implementation Plan, where we put this all together and put together our blueprint for how we are going to get from where we are now to clean air, or in those areas that enjoy clean air today, how we're going to preserve that.

In summary, our goal is to ensure that Californians enjoy clean air, and it's breathable all the time. We don't have bottled air like we have bottled water. And to do that in a way that also ensures that we achieve our economic and other goals.

And with that I'll end, and be happy to answer any questions. Are we going to have questions now, or are we just going to do presentations?

MS. ALLEN: In order to keep things

moving along, I thought we could have questions at the end of each part. As noted on your agenda, this is part One. So we'll keep going with the presentations and then have questions at the end.

MR. SCHEIBLE: Thank you.

MS. ALLEN: Mr. Scheible's presentation is not out on the table yet to my knowledge.

MR. SCHEIBLE: It's on the table now.

MS. ALLEN: It is on the table now. It looks like this. It came in pretty close to when we started, so it's not in your notebooks yet. Please do keep checking the table to see if there are any handouts that you haven't received.

I hope that the powerpoint presentations will be posted on the Energy Commission's website today, and if not soon after. So be sure to check the Energy Commission's website if you haven't been able to get the powerpoint presentations or you'd like to make extras.

Our next speaker is with the Air Resources Board. It's Barbara Weller, Ph.D. She is the manager of ARB's Population Studies Section. And she will be presenting information on the health effects of air pollution.

MS. WELLER: Hi. My name is Barbara

Weller. And I'm glad to be able to give you some information on the health effects of air pollution and some of our programs at the Air Resources Board.

Well, we've already heard something about the pollutants that we're concerned about, so I'm not going to go over this in great detail. Obviously we're concerned about particulate matter. I think that some of my slides will show you why.

We're concerned about toxic air contaminants, including diesel particles, and the gaseous pollutants are a concern -- ozone, nitrogen dioxide, and carbon monoxide. We love these pyramids, so here you can see another pyramid.

But this is to help you understand that there have been a number of scientific studies that link the health effects that we have seen with air pollution exposures. And the health effects from air pollution have a broad range.

They range from everything from eye and nose irritation and cough to some more serious effects, including life threatening effects and death. And you can see that some of the more

serious effects are listed here on this slide.

Now, as you heard before from Mike Scheible, of course the most devastating effect of air pollution is premature death. But some of the other effects listed here are also a concern.

We're concerned about cancer risk, birth outcomes and development -- I'll explain that a little bit more in the next slides. We know that air pollution increases the risk of hospitalizations. These are mainly for respiratory and cardiovascular causes.

And we know that air pollution has been implicated in an increase in asthma attacks and bronchitis. So I'm going to go over these in more detail in the next few slides.

Air pollution increases the risk of cancer. In fact, the evidence that we have today indicates that up to 380 potential cancer cases per year could result from the exposure to air toxics in California.

When you look at the cancer risk, most of the things that you're talking about is lung cancer, and some of the pollutants that have been implicated in the risk of lung cancer include diesel particulates, asbestos, and chromium.

Benzene has been implicated in an increase in leukemias and nasal cancers have been implicated in exposures to formaldehyde.

Now, as we said, the most devastating effect of air pollution is premature death. We've known for some time that air pollution can cause premature death.

In fact, in the 1950's and 1960's there were very high air pollution episodes that resulted in the deaths of thousands of people. These people were mostly over the age of 65 with heart and lung disease. And of course these levels were very, very high. And we don't see those high levels today.

However, we still see premature death from the air pollution levels that are found today. And again, the people that are dying from air pollution are mostly the elderly, those with heart and lung disease.

The thing to remember about the premature death from air pollution is that these people are not dying just days before they would normally, but years before they would normally. In fact, up to a 14 year reduction in lifespan has been calculated from premature death from air

pollution.

And one of the things that we're now beginning to look at very closely is children. In fact, some of the old air pollution episodes have been re-evaluated, and a spike was found in children under the age of two.

So we have been looking at this more closely and there's some new scientific evidence that indicates that children under the age of two may be vulnerable to premature death from air pollution. And in fact sudden infant death syndrome has been implicated in exposure to air pollution.

When you talk about premature death and air pollution you're mostly talking about particles. Hospitalizations are known to be increased with exposure to air pollution. If you look at respiratory causes, an increase in 4,080 admissions per year in California. From cardiovascular -- it causes 3,390 admissions.

Again, particulates are one of the big players here, but ozone is also implicated in increased hospitalizations for air pollution exposure.

As I said, air pollution has been

implicated in birth outcomes. If you look at still birth and miscarriage, lead has been implicated there. Also in low birth weight. In low birth weight particles have been implicated.

And the impaired cognitive ability in children results from exposure to lead. And we've heard how we have made great strides in reducing lead pollution in California. In addition, we have found, through the children' health studies -- which I'm going to tell you a little bit more about later on in my slides -- that reduced lung function growth occurs in children that are exposed to high levels of particles, nitrogen dioxide, and acids.

When you think of the disease most close associated with pollution you think of asthma. We know that air pollution worsens asthma. It causes up to 340,000 attacks per year in California. We know that air pollution causes more frequent attacks. It causes more severe attacks.

Air pollution has been implicated in an increase in bronchitis in asthmatics. And air pollution results in lost work days. Up to 2,800,000 lost work days per year in California result from air pollution exposure.

One thing that you have to remember about air pollution and its effects is, if your child is sick, someone must take off work to take care of that child, so it affects the whole family.

When you talk about these types of effects with asthma and bronchitis you're mainly talking about ozone and particles, again those are the big players.

Okay, in addition to the health effects that we see from air pollution there are a number of things that air pollution does to our ecosystems. Air pollution decreases visibility. This is something that the public uses to judge air quality.

And pollution damages our forests and affects our ecosystems. It reduces crop yield in California. In addition, air pollution contributes to global climate change, and in fact you will hear more about global climate change later on this afternoon.

Well, we've heard about some of the health effects of air pollution. Who are our most sensitive populations -- and I've talked a little bit about that before -- but let's go through some

of this.

Children are more sensitive to air pollution, and one of my slides coming up will tell you why. Children are at the beginning of their lifetime, so any lung damage in a child is going to persist in effects that are going to persist throughout their lifetime.

The elderly, as we've heard, are more vulnerable to air pollution. Those with heart and lung disease are more vulnerable. Including people who suffer from respiratory illnesses such as bronchitis.

Now you might wonder why athletes are up on this list. Remember that people who are outdoors working hard, breathing hard, the way athletes are in their training, they're going to be taking in a greater dose of air pollution and are vulnerable because of that effect.

In fact, one group that is not up here but should be considered a sensitive population are people who, because of their work, are exposed to higher levels of pollutants. And this would include people like truck drivers and railroad workers and heavy equipment operators, who are exposed to higher levels of pollution because of

their occupation.

Now remember that I said that children are vulnerable to air pollution. Well, it's important to remember that children are not small adults. Children are still growing and developing and they're vulnerable because of that.

They're at the beginning of their lifetime, and as I said, any effect in a child may persist in changes throughout their lifetime. Children tend to be out of doors more than adults.

We spend most of our working day inside in an air conditioned environment, but children spend a lot of their time outside playing. And when they're playing their breathing rates are higher. And a child's breathing rate is higher than an adult even in a resting stage, so they tend to take in more air pollution.

And they get a greater dose. We need to know more about air pollution effects on children. And to be most effective these studies need to be long-term because children are exposed long-term.

Now another reason we're concerned about air pollution is childhood asthma. This is a very complex disease and a very complex issue, but we know that childhood asthma is on the rise. In

fact, the leading cause of hospitalization in young children is asthma.

And we know that air pollution worsens asthma. We have some very recent evidence that indicates that air pollution may play a role in initiation of asthma. And this asthma-air pollution link is one of the focuses of ARB's research programs.

So air pollution affects, really, all of us. It causes serious health effects, and we've seen that we're all vulnerable at some point in our lifetime. Air pollution affects children, the elderly, workers because of their occupation, athletes working out of doors.

Air pollution has major effects on our communities, on our climate, our ecosystem, and our health. And we have a very aggressive research program at the Air Resources Board to look at the health effects of air pollution.

And we use this information to set standards which are protective of health. The Children's Health Study is one of our largest and longest term exposure studies, looking at the health of children in the L.A. basin area.

And this study has studied over 5,500

children in the L.A. basin. We've seen a number of effects from this study, including the fact that ozone is implicated in an increase in school absences. This was mainly for respiratory illnesses.

And we found that particulate matter was associated with an increase in bronchitis in asthmatics in this study. As I said, the 12 communities for the Caldron Health Study were scattered across the Los Angeles basin, you can see the 12 communities here.

The communities are chosen for their differing pollution profiles. Mira Loma, for example, tends to have the highest particulate levels. Alpine and Lake Arrowhead tend to have the highest ozone levels. Some of our clean sites are located here on the coast, such as Santa Maria and Lompoc.

And some of the communities in the Children's Health Study were chosen to be impacted by what we call transport pollution. That's pollution that moves downwind from a source. It changes and undergoes chemical reactions as it moves downwind. And some of those sites are Upland and Riverside.

And you can see some of the more recent results from the Children's Health Study. When acid vapor, NO2 and particulate matter were elevated, that resulted in a reduction in lung function growth.

Now in fact this is the most consistent finding with the Children's Health Study -- a reduction in lung function growth in the children who are exposed to higher levels of particulate matter, nitrogen dioxide, and acids.

They have also found some chronic effects of ozone in the Children's Health Study. Elevated ozone was associated with a reduction in peak flow rate. That's just a reduction in one of the ways that the lungs function.

We also found -- and it's not up on this slide -- but elemental carbon, when that was elevated, it was associated with a reduction in lung function growth as well. So this may be an effect of diesel exhaust.

And they also found that there was an increased risk of developing asthma in children in the high ozone communities that played three or more team sports. Now playing a lot of team sports was used as a surrogate for activities.

Obviously these children are going to be very active, breathing in a lot of pollution. And they found that it was a 3.3 times greater risk of children developing asthma in the high ozone communities who played three or more team sports.

This is one of the first studies that have found this link of air pollution and initiation of asthma in children, and obviously we would like to see these results replicated.

Now this study is just beginning. This is the Fresno Asthmatic Children's Environment Study, or FACES. This study takes place in Fresno. The study is designed to look at the long-term progression of asthma symptoms, and as asthma changes in the children over time, looking over the environmental factors that may implicate those changes.

And the particulate pollution is one of the emphases in this study. That is, as you can see, a great concern of ours. So we wanted to look at that in the Fresno area with these children. We're looking at 300 children who are already diagnosed with asthma in this study, and the study's just beginning.

So all of the information that we gather

from the health studies at the Air Resources Board are then used in our standards setting process, to help set standards that are protective of public health.

The Children's Environmental Health Protection Act was enacted by legislation in 1999. And that required that we re-examine the standards to see if they were adequately protective of children.

The initial review was completed and we found that the standards may not be adequately protective of children, and that set the priority for future reviews. Particulate matter was set as the first standard to be reviewed.

I think you can see why from the information that I've given you. And ozone was the second standard to be reviewed, then followed by nitrogen dioxide. Now we have recently evaluated the state standard and are updated standard is listed her in red.

You can see that the state standard for particulate matter is more health protective than the standard of the EPA or the European Union, but it's still within range of the standards set by the EPA or the European Union.

Now we also have a Toxic Air Contaminant Program. You've heard me talk a little bit about air toxics today. The Toxic Air Contaminant Program was established by legislation through Assembly Bill 1807. And this requires that we set toxic air contaminants on the basis of their health effects.

We work in cooperation with the Office of Environmental Health Hazard Assessment, and we also have a scientific review panel which helps us to review the scientific literature which sets the toxic air contaminants.

The Toxic Air Contaminant Program is designed to not only inform the public of the risks of air toxics, but to also help reduce those risks.

We also have a very aggressive diesel program. Our goal is to reduce diesel particulates by 75 percent by the year 2010. You can see some of the components of the diesel control program on this slide, and more can be found on our website.

We have a number of community health programs, which really are designed to look at some of the monitoring of communities and areas

where children live and play. And you're going to hear more about some of these programs today.

In fact, the next talk will be covering the Environmental Justice Program, and some of the tools that are being developed to be used in the Environmental Justice Program.

So we're going to continue to be committed to clean, healthful air for all citizens of California. And as part of this commitment the Air Resources Board is going to look for new ways to help gather more information about the health effects of air pollution. Thank you.

MS. ALLEN: Thank you, Barbara. The next presentation is by Beth Schwehr of the Air Resources Board. She is in their Environmental Justice section. She'll be talking about an Air Resources Board program, the Community Health Air Pollution Information System.

MS. SCHWEHR: Good morning. Thank you. As part of our commitment to the community health program and the Environmental Justice Program that Barbara was just mentioning, stakeholders have asked us to try to make information more accessible on some of the emission sources and their emission levels.

We have them in a large database now, but it's difficult to get at that information. So what we've been designing is a web-based mapping tool that provides dynamic maps to users. The tool is named CHAPIS, because it's called the Community Health Air Pollution Information System.

It's in an advanced prototype stage right now. It's designed to provide interactive maps that the user can zoom in to a neighborhood that they're interested in and see the air pollution emission sources on the map. All they need is their web browser. They don't have to have any special software.

The maps include the stationary or large industrial sources as points on that map, and it includes the contribution from the mobile and the area-wide sources by dividing the state into kind of a grid system. And then allocating the emissions that are estimated at county levels into those grid squares, using spacial surrogates.

For example, if you have consumer product emissions for the county they can be allocated based on the distribution of population density to smaller areas. The CHAPIS system is designed to provide both maps, to look at the data

visually, but also then be able to drill in and get access to the underlying tabular information.

We are developing it and populating the data into CHAPIS in collaboration with the California Air Pollution Control Officers Association and the local district's staffs.

I'm going to show you screen captures today that the application is live on our website, but we've not yet released the website address to the public, because the data that are in in right now are prototyped. They're mocked up for testing purposes.

So don't think of the data that you see today as in any way real data. Because it is important to have high-quality data when you make the data so available, so visible, we're populating the data for the individual point facilities in stages to ensure good quality and up-to-date information.

We're starting with an initial group of pollutants and initial categories of facilities. So for example, for the criteria pollutants, the nitrogen and sulphur oxides, organics, particulate matter and so forth, we're starting with those facilities that emit ten times per year or more of

those criteria pollutants.

For toxics we're beginning with the refineries and the power plants as well as facilities that were a part of the air toxic hotspots program that conducted health risk assessments, initially in three categories -- metal fabrication, chemical plants, and aerospace facilities.

And then over time we'll be adding on to the source categories that we put on the map. We're doing that in coordination with the air pollution control officers, and we're going to be adding things like the other facilities that conducted risk assessments under the hotspots program -- gasoline stations, metal platers, and dry cleaners.

We anticipate releasing the first set of maps, with the first group of sources that I mentioned, in the summer timeframe. Initially, when we launch this, it will be linked in through our community health web pages, and will set some context.

For example, to make it clear that, generally speaking, cars and trucks often dominate most of the air pollution impacts. More so than

an individual point on the map. So we want to make sure that people understand that, and that we provide tools in the form of these gridded emission layers in order to see the combined contributions.

So this is, for example, the first page of the CHAPIS application. The users will see a page like this. They can enter their zip code, or they can pull down an area of interest.

So let's say we choose Los Angeles County. The map will load, and you see the basic map window. There are tools across the top that do things like zoom in and pan left and right. Some analysis tools that I'll talk about. There's an overview map, you can toggle it on and off, so you can see where you are.

Generally speaking, the first step is to choose a pollutant, so let's say in this case I choose benzene as the pollutant. And I use the zoom-in tool, and draw a rubber-band box in an area of interest, and it now zooms in to that area.

This is why I mentioned, in order to see combined sources -- all of the mobile sources as well as the point sources -- we use this gridded

emission option. And what that does is it divides the area into these grid squares that are a kilometer or two on a side, and the user can choose to see any or all combinations of the various source types.

That is, on-road and off-road mobile, the large industrial sources, the small commercial sources, and these area-wide or dispersed sources like consumer products or architectural painting.

And if a point source falls within that grid square then it's benzene adds to the color of the square. If a roadway cuts through it then its benzene adds to the total benzene for that square.

If the user wants to see the numeric contribution they can click on a grid square and they'll see the actual tabular information for the amounts in that cell.

Now as I turn off the gridded layer and zoom in further -- one of the things that we've designed here is that many of the layers are what we call scale-dependent. That is, you get to see more detail as you zoom in further and the map can accommodate the detail.

So at this resolution, for example, airports are shown as just a point with a little

airplane symbol. But if I zoom in tighter you see that it becomes a polygon, an actual boundary footprint for that airport. And that allows you more information as you go in.

So, for example, if I zoom in to a typical sample neighborhood, you see as I zoom in that the points on the map are these little triangles, and the size of the triangle indicates the relative amount of benzene in this case that was reported from that facility.

I've zoomed in now to where I can see hospitals, schools, and roadways and streets and parks and other landmarks that help you identify your location.

We've designed a hovering label tool, so that you can quickly tell what the identity of the facilities are. As I hover over the facility the name appears here. if I hover over another facility the name appears here.

We've also designed a little bit of analysis capability, although it's primarily a visualization tool. One of the types of analysis we know people are interested in -- let's say that they've zoomed into an area where they're interested in that whole community or that whole

neighborhood that's in the map view.

Then what they can use is, this calculates statistics to get a summary for the whole map view. It provides a total for all the benzene emissions in the view, as well as a ranked list of the facilities that emitted benzene in that view. For example, in sorted order here.

And each of those facilities, we can take advantage of the ability of the web to do hyperlinks, so each of these facilities is itself a hyperlink. So if I want more information about a particular facility I can click on it. And that brings me to a link.

What you've seen so far has been within the CHAPIS application itself. Now what CHAPIS does is it goes out and links to another set of web-based query tools that we have that access our underlying emission inventory database directly.

So at this point it's gone to that database and looked up that facility, and now it can give information on all the pollutants at that facility, not just the benzene that was on that map, for example.

And if that facility has been a part of the air toxics hotspots program -- and it has data

on prioritization score and health risk assessment -- that link is also there, and it provides information on the prioritization score and the health risk values relative to the local district's notification threshold values.

One of the special features we've designed into this calculates statistics functions, in that sometimes people may not be that familiar with individual chemicals, and they may not know which one they should look at or which one might be important.

So what we've done is, if they don't choose a pollutant, they get a summary for all of the chemicals. And each of those chemicals is also hyperlinked. So, for example, if they don't know very much about benzene they can click on it and a short report comes up that provides information on what is benzene, what are its characteristics, what are the typical sources and emissions.

The other thing in this list is that each of the pollutants is also provided with a potency weighting -- that is, each pound is multiplied by its relative cancer potency, to give some idea of how much concern that pollutant might

be.

And if the user is not familiar with these terms there's a hyperlink to an online help that explains the terms.

We're working on a more advanced version or feature on this that will actually bring up a simple bar chart that gives people a graphical view of the relative contributions of the on-road and off-road mobile, the large and small point sources, and the area-wide sources.

People can also use the tool to measure distance between points using simply a line, or a more common question is what's within a radius of some distance of this school or this facility.

So for example, I can set a distance, a radius of a half mile, and then click on this school and say what's within half a mile of it. Or I can say set this to a mile, and say what's within a mile of this facility, or a mile of this facility. And begin to see qualitatively the overlapping areas of influence.

There's a button to do a printer version of the map, which automatically puts the legend and an overview of where you were, and what pollutant you had selected and so forth. The user

can also select a particular industry category, and when they do that that industry category continues to have black triangles, and the others go into grey.

So you can quickly see within an area a particular category of industry. We also know that it may be that in some cases we will have addresses for certain facility types, but for many of the small ones we may not have site-specific emissions for them.

So in that case what we can provide is still the spacial information about where they are located by having a symbol on the map, but when you click on it, instead of getting actual emissions if we don't know that, we can have an information box.

And that information box can contain perhaps typical ranges of emissions, and a hyperlink to other information, such as any control measures that are underway for that source.

The air monitoring stations are also points on the map. Here's an example of one. And if the user wants to get information on the actual measured air monitor data they can click on that.

And it links to existing web query tools as well for data on the measured air levels.

We are also working on, in the future, to make a link between another sort of parallel effort we have underway to do a similar interactive mapping application called AQMIS, which is the Air Quality and Meteorology Information System, which provides near-real-time air monitoring data.

And there will be in the future more of a link between CHAPIS and AQMIS. Our long-term vision is kind of a centralized web portal that someone can go to, get information on emissions, meteorology and air quality, all using common input data, so that you can make comparisons between these things and do what if analysis. And all of it delivered on easy-to-use maps on a common GIS backbone at our website.

What I've been talking about so far is kind of phase one of the CHAPIS application, where we will have emission maps. Our long-term goal is to develop additional tools to look at air pollution impact assessments.

And that would be eventually to put maps of actual estimated risks on the website as well.

To get to risk from the emissions requires us to look at air dispersion modeling, which Mike Scheible talked about earlier.

We would look at a combination of both local-scale modeling, as well as regional modeling that considers the photochemistry and reactions that occur in the atmosphere. And then this would be linked to tools that we have through the HARP software program.

HARP stands for the Hotspots Analysis and Reporting Program. It's a tool developed to do site-specific risk assessment, and it embodies all of the approved methods for doing risk assessments in California that have been developed by the Office of Environmental Health Hazard Assessment.

And HARP is a tool that is being developed in parallel, it's also scheduled to be released this summer. So when we combine the modeling and the HARP tools we'll eventually be able to put maps of risk as well as maps of the emissions sources.

So to summarize the CHAPIS visualization tool, in its first phase it's designed to help users visualize and analyze data on emissions and

emission sources, and to see the spatial relationships between them.

Our long-term goal is to combine not only the emissions but the air quality data, modeling and toxic risk information, and other data -- for example, even demographic data. What we've learned is definitely that data quality is very key when you make -- and easy to find the information like this.

It's important that it be up-to-date. Our goal here is to communicate data and promote involvement of a greater range of stakeholders in the processes of decision making, and to make sure that there is information available to get into the hands of decision-makers to avoid situations like siting a school and a source much too close together.

I'd like to acknowledge the programming support from Vestra Resources, Dillingham Software, and Desktop Advantage as well. We've had very successful collaborations with them in developing some of these applications. Thank you.

MS. ALLEN: Thank you, Beth. Our next speaker is Dale Edwards, the Energy Commission's Environmental Justice Coordinator. And he'll be

talking about how environmental justice is approached within the electrical power plant siting process.

MR. EDWARDS: Good morning. I'm going to go fairly quickly because some of this is not as germane to the topic that we're talking about today, and it's some background for some of you, and others may have heard this before.

At this point in time, we started off with our EJ analyses back in 1995, and at this point we have, approximating, about 60 projects that we've done EJ analysis for. 14 of these were for peakers back in the energy crisis just a couple of years ago.

Currently we're still working on approximately 15 power plants where we're doing EJ analyses. I would make a point about this -- we can get into this a little bit later in my presentation -- but because of the unique nature of California's demographics we can't hardly go anywhere with a power plant where we don't run into an environmental justice population of some form.

And I'll get into that explanation a little bit more in a moment. To date, we don't

have a Commission policy or adopted EJ policy, but what we do have is a Siting Division-approved EJ approach which we've used for many, many years, and we do follow the 1998 USEPA EJ guidance.

For demographic screening we use a six-mile radius, which is the same as the 10-kilometer air quality analysis. The air quality unit uses a 10-kilometer radius for the cumulative impact analysis, so we felt that was the appropriate distance for an EJ analysis to encompass for all the technical areas largely going with the air quality unit.

We also look at one- and two-mile radius map when we look at what the demographics are in an area. And I'm going to show you a couple of the maps here in a moment, just to show you how that works out.

We have what we call the potential affected area, and then the actual affected area that we ask staff to look at. The potential affected area is the six-mile radius, because that just gives you the total demographics for the six-mile distance.

But in fact each technical discipline -- we have 11 of them at the Energy Commission that

we consider to be EJ-related -- look at -- and each of those can have a different distance or different manner of shapes of areas that are actually affected.

And we do emphasize for these maps, when we look at the demographics, that the population that we're looking for must be greater than 50 percent, either in the six-mile radius itself, or in pockets or clusters, which we define as census blocks.

This is a map of a case that is still ongoing. To show you the six-mile radius, how it comes out --just looking with colored shading, which we typically use. The darker being the 50 percent or greater or even higher, such as 75 percent or greater.

In this particular case it's something in the order of 45 percent at six miles. But this is a good example of why you can look and see that you do have pockets with the darker shading, and when you look at the one and two mile it gives you even a more clear idea with the proposed power plant right in the center and various very darkly shaded areas.

And when you do this actual affected

area kind of analysis, if the particulate emissions or whatever it is that you're dealing with goes off to the northeast you may not have a problem. But if the effects are moving down to the south or the southwest then you may have a problem.

So you can see how doing a technical area-specific analysis when you're looking at the demographics can lead you in a different direction, depending on what the actual affected area is.

As far as outreach, we're fortunate to have a Public Advisor here at the Energy Commission that helps a great deal with our reaching out to communities to make sure that community groups are especially notified or asked to participate in the Commission's process.

We also have a Media and Communications Office that does a lot of work as far as getting the word out through communications media regarding power plants that are proposed once they're applied for with the Commission.

We do try, on a regular basis, to provide information in Spanish as well as English, when it's appropriate in the local area. We also

have -- at our Commission's Information Hearing -- we do an EJ approach brief presentation to explain that we do in fact do an EJ analysis.

And throughout the Commission's power plant siting process there are multiple opportunities for public input, at workshops or in writing. Again, I mentioned that there are 11 technical disciplines, but most notably for most of the public and ourselves, air quality and public health are the two key areas that people usually are most concerned about.

Again, each discipline determines its own affected area, which may defer from that six-mile radius. And if a significant impact can't be mitigated, staff would then determine if there's a disproportionate impact.

That in a nutshell is what environmental justice is, of course, is to -- it is, in our case at least, a CEQA-based analysis. And if we get to a point where we find that we have an unmitigated impact, then we would take the next step of determining whether that impact is in fact disproportionate on the environmental justice community.

In the case of air quality -- and staff

have been doing this for some time -- always seeking to find local mitigation for local impacts. And that applies to both construction and operation impacts.

And finally, just to give you some sense of what the difference is between a CEQA analysis and what we would consider to be an environmental justice analysis is that we do give the non-English speaking population in the area, or the affected area in particular, of a proposed power plant process, an opportunity to participate in the process.

To tell us what's on their minds and to ensure that they get the information, and understanding what's happening in their neighborhood. Also, staff do consider information regarding existing conditions received from the community. This is back at the workshop setting again.

This is one of the other elements of the environmental justice process as we do it here at the Energy Commission, is to actually have a dialogue with the community. It helps us to understand whether we're capturing everything that's going on in the community.

And CHAPIS is a very good example of a tool that we will be using in the future. Because this has been one of the areas that we potentially have the most difficulty with. And that's understanding what exactly is happening in the local community, other than what we get through stationary source monitors and such.

And finally, staff has, in the last year or so, initiated some work in -- and the ARB is in fact involved with this to some degree -- an improved air quality model, which will allow us to better identify and to predict what the emissions would be in a localized area like a smaller area of that six-mile radius.

Where you may have an environmental justice community. So we can identify whether in fact the existing condition is an overburdened case.

CHAPIS is going to be very helpful in that regard. This modeling here, as much as was described, will help us to predict -- based not just on the emissions but also the air dispersion modeling -- to figure out what might be happening.

So in combination with the CHAPIS, it sounds like -- this is the first time I've heard

the CHAPIS presentation, it sounds like an extremely valuable tool that we'll be happy to use.

But with this improved modeling that we're seeking we'll have a pretty good complement. And that concludes my presentation.

MS. ALLEN: Thank you, Dale. I am actually the next speaker. I'll be giving an overview of the Energy Commission activities in the air quality and health areas.

My role at the Energy Commission is as staff supervisor in the Commission's Environmental Protection Office. I'm also the System's Assessment and Facilities Siting Coordinator for the staff's work on the Integrated Energy Policy Report.

So that's why I'm here as moderator of the workshop, because I'm the staff coordinator for the work coming out of that division. The Energy Commission's air quality programs are spread out over several sectors.

In generation, our work involves powerplant siting, air quality analyses, compliance monitoring, tracking emission trends for policy implications -- if I'm fading in and

out I'll try and do better with the microphone.

In the transportation sector there a number of alternative fuel vehicle programs. We are not going to get into discussion of that in today's workshop, but there's more information on the various programs on the Commission's website.

And petroleum dependence reduction strategies per AB 2076. That is the topic of a presentation later on this morning.

Next slide, please. In the greenhouse gas area the Commission maintains an emissions inventory and provides guidance to the California Climate Action Registry.

And then there are a number of programs in the Commission's public interest energy research section. There are particulate and ozone studies that are underway now.

There's also a handout about the PIER program studies in the air quality area. That handout looks like this, and it is out on the table.

I mentioned the Energy Commission's website as a source of a variety of information on any of these programs. That concludes the overview. That brings us to the end of Part One

as far as the powerpoint presentations.

Commissioner Boyd and Chairman Keese, do you have any questions for any of the speakers?

CHAIRMAN BOYD: No, I don't. I just want to commend the speakers for some very interesting information I picked up this morning. Thank you.

CHAIRMAN KEESE: I would just ask Mike, on behalf of the group, you obviously look at the air implications, and we look at air implications whenever we do a power plant siting case -- I'm talking about the power plant area specifically.

And the rules that you adopt are rules that we incorporate and evaluate, both for LORS analysis, specifically, and then a CEQA analysis overlaying. In setting your rules, do you look at the area of power generation as a separate area, or do you basically look at your rules, and then power generation falls in there?

MR. SCHEIBLE: I would say that we look at just the pollution impacts in general, and then design strategies that mitigate and meet the legal requirements for that. Because power plants are a large, stationary source they become a major element of that.

So we don't look at energy first, we look at air quality first, and then talk about looking at the general rules for siting.

On the technology side, however, when we get down to saying what's the best technology that can be applied, then there's a lot of specific looking at well, when you're going to make electricity what are the options, and how well can you do that with minimal air emissions. So then you look more directly at the source.

CHAIRMAN KEESE: I think my concern -- which of course has come out of the huge expansion of the number of cases that we've had over the last couple of years, and I think the number is up to 15 that we're still working at -- is that it seems to be uniformity, consistency of decision-making, is important.

And we have identified, in our siting cases, a number of issues -- and EJ issues came up also. But issues like soot filters on construction equipment, and ammonia slip, and the relationship of a 2.5 NOX standard or a 2.0 NOX standard as it affects others.

I think it's important for the Commission to have consistency, but I think it's

important for the applicant to know what the rules are going in. I'm just wondering if you have any ideas as to how we arrive at conclusions that can be applied uniformly?

MR. SCHEIBLE: Well -- and in some ways the target is moving. As technology advances and a client comes in and, for example, decides that offsets emission credits are very expensive and it wants to employ new technology that lowers its emissions so that it has less of a burden.

And if it proves that that technology works then that becomes a benchmark for the next unit. I'd also say that in many cases the air districts would probably issue a permit that's consistent with its rules and the legal requirements, but the community demands more.

Or the project proponent wants to do more of mitigation, for example construction or other things. Or local offsets rather than regional offsets.

So I think some of the things are standard in terms of you've got to use the best technology available and you have to have a package that mitigates regional impacts. And then other things may be project specific and worked

out, the same as for water concerns and other concerns.

So I think consistency makes sense but it's not always going to be if you meet exactly this it'll work for every location.

CHAIRMAN KEESE: So it should be air district by air district, or a statewide --?

MR. SCHEIBLE: I think it's almost site by site for some of the efforts. I mean, I think on basic things like technology, yes, employ selective catalytic reduction and that type of thing. All the new plants, regardless of their location, will have it.

And in other areas I think it will be more site-specific.

MS. ALLEN: Dave, please identify yourself?

MR. ABELSON: Thank you, Eileen. My name is David Abelson, I'm Staff Counselor at the Energy Commission working on siting cases, and also assigned to the Integrated Energy Policy Report proceeding.

I actually have two different questions that I think might help to have on the record a little bit.

And the first one I direct to Mike Scheible, which is could you say a few words about the relationship between EPA, ARB, and the districts, with regard to who has the primary responsibility for stationary source review, such as we would be dealing with here, with power plants? Just to make that clear for the record.

MR. SCHEIBLE: Okay. The permits are actually issued by the air pollution control districts, and under state law they are primarily responsible for ensuring that the plant complies with state and federal requirements.

But part of that responsibility is to make sure that if there is a state law or an Air Resources Board clear policy on it, or an EPA requirement on it, that that's also met. In reality, a plant that runs afoul of any of the agencies expectations is going to have difficulties.

And so we try to work that out so that the proposal that finally gets considered by the air district and approved by them is something that all agencies believe is both believable and within the policies established by the different agencies. Otherwise, the permitting process just

doesn't work very well.

MR. ABELSON: But are the districts in effect -- without going into much depth -- are they basically capturing in their rules the standards that are embodied in the state implementation plan that's been reviewed and approved by EPA? Is that sort of the hierarchy?

MR. SCHEIBLE: That's their responsibility, to make sure that their rules comply, not only with the things that they have discretion over, but with also the basic requirements of state and federal law.

MR. ABELSON: The other question or comment I have -- and I'm not sure to direct it to -- perhaps it's the lady who presented the information on the CHAPIS model that you all are putting together.

I've been struck -- in the few siting cases that I've worked on directly -- about the tension, the political tension, the emotional tension, that often occurs between the local citizens, who see this large, technical plant going in with a big stack and a lot of emissions coming out of it, versus the role of our staff and the ARB and the districts and so on, trying to

explain why air pollution is actually kind of a regional problem, kind of a cumulative effect of a lot of different sources.

And I'm wondering if the CHAPIS program, which is apparently designed as outreach to the community, is going to try and do anything to explain to folks the difference between having the stack in your back yard and having health impacts, which can be a function of a number of sources combined?

MS. SCHWEHR: Yes. There are a number of things that we'll do to try and address that.

One is, as I mentioned, there'll be some context pages that the user will read before they go to the map, because one of the key pieces of information there is that, in its first stage, where we're looking just at the emissions, one of the things we need to make sure people understand is that is not a direct correlation to the exposure of that individual.

It matters how those pollutants disperse. So we mention that the dispersion is different, depending on the kind of release characteristics of the source. So, many times, if the emissions are released from a taller stack

they are dispersed before they reach sensitive populations. In some cases it's more ground-level emissions that are of greater concern, in terms of their health impacts.

In the second phase that I mentioned, where we move on to actually show not only emissions but gridded risk on the map, that will be taken into account. Because the air dispersion modeling is a part of that analysis. I think Dale mentioned that in his presentation.

We're looking at ways to do modeling on a larger scale for local effect. And that definitely bears out some of the things you were mentioning, that many of the issues look like regional background issues.

There is, in almost every urban area, most of the levels look very similar and very high, especially for the toxic air contaminants. And they're generally dominated by vehicular traffic.

And that those emissions are very broad, and most areas see a very common regional background level. It tends to be more the rarer case that very, very close to a smaller ground-level source is where you tend to see the higher

risk levels of toxics.

Mike, I don't know if you had anything you wanted to add?

MR. SCHEIBLE: Well, I think that a system like this will be very helpful to let people in neighborhoods put into perspective the proposal in terms of is it more or less important than the major highway that's 200 yards away from my household.

I think people commonly think that, because it's a power plant, it is the major source of pollution in the neighborhood. And that may be the case for some pollutants in some areas, but in most cases it's going to be it's just another one of many sources impacting the particular site.

MR. BEYER: Hello. I'm John Beyer. I'm a contract manager and project manager here at the Energy Commission in the PIER program. And Mike Scheible, I have a question that's kind of a follow-on to your answer to Chairman Keese.

At the end you mentioned using SCR, selective catalytic reduction, for power plants. I'm the manager of a couple of projects relating to making the combustion process in gas turbines ultra-clean. One of the contractors is Catalytica

(sp), another is Alzada (sp).

With these technology developments we're trying to prevent the creation of the pollution -- the NOX in this case predominately -- in the first place, rather than cleaning it up with SCR, which is used by and large.

An issue will be the meaning of best-available control technology, because with these combustion processes we're getting the pollution levels from turbines and all size ranges down to, oh, sometimes less than two PPM, one PPM.

It's exceptionally clean, it's on the level of the cleanest of power plants with SCR out over a broad size range. It also has the advantage that, without using SCR you don't have the risks and hazards of ammonia -- transporting it, storing it. And you don't have ammonia slip out into the air.

However, it's possible to envision regulators saying "oh good, you've developed this marvelous technology, now put SCR on anyhow." If that happens, it will both destroy the incentives to both develop these ultra-clean combustion technologies, it will also reduce the opportunities for distributed generation, which

allows you to do small gas turbines that are exceptionally clean.

And with all the benefits that accrue to distributed generation, like avoiding additional power lines, distribution lines, and many other benefits.

So I'm wondering what your approach is going to be when you're debating between a possible replacement technology for SCR, or others saying "well, now do both," to get it down to levels where we can't even measure the NOX anymore?

MR. SCHEIBLE: If I have to guess, I think we look forward to being in that predicament.

Where the technology enables the levels to be so low that it's a tough call to say, well, should we do something that gets us to where we now are with an add-on control, and then have to make the decision does it still make sense to then make that the starting point.

And then say do 80 percent or 90 percent better than that. I think we look at it the same way we have traditionally. One is what are the magnitude of the emissions, and what kind of costs

are incurred for the next incremental control. And you get down to very low levels out of the basic device.

Then the cost-effectiveness of an after control system is very large. And I think we generally would like to see systems that don't create emissions in the first place that have to be controlled.

So that's a policy call that we have to make, based on the air quality situation and the economics. And we don't require -- our guidance doesn't call for SCR on all units as it is now in terms of very small units because of cost considerations.

MR. BEYER: Well, it's coming very soon. Because we're putting together a project at Riverside Public Utilities in southern California to actually remove the SCR from one of their gas turbines at Springs generation plant, and install a catalytic combuster in place of SCR for a test demonstration project, hopefully to go online within a year.

MR. SCHEIBLE: And our standards are basically performance-based, in terms of here's the pollution out of the final configuration that

we expect to achieve. And whichever combinations of technologies reach that is generally acceptable.

Usually there's a base technology that we say can do that cost-effectively, and that causes the standard to be set at that level.

MR. BEYER: My concern is BACT.

MR. SCHEIBLE: BACT direct.

MR. BEYER: Which would suggest you have to do everything conceivable.

MR. SCHEIBLE: But in reality it's not everything conceivable. I mean, you could have an SCR on top of an SCR unit conceivably.

CHAIRMAN BOYD: Mike, a question that's been rattling through my mind, and I was actually saving it for the next panel, but Commissioner Keese kicked over the can and Dave continued it, and now there's more.

It gets into the relationship between the energy agency, the air board, and the local districts, and the need to keep that strong and reinforce that as we come to issues like the technical policy issue just put on the table by the previous question.

But the first question going through my

mind was the issue of air quality knows no regional boundaries. Air districts have artificial lines drawn between them. Power plants sometimes are deeply embedded within an air base in either south coast district. And you don't wrestle with crossing boundaries.

In other parts of the state a power plant may be very close to a boundary, and there may be differing approaches between the two districts to power plant emissions or just air pollution emissions in general.

And that gets to be -- as we've seen painfully in a couple of power plant siting cases here -- an issue of differing interpretations of what's necessary to protect the public health of the downwind impacted people.

You know, the rules of the downwind impacted people's host agency, or the rules of the agency where the power plant is sited. And i'd just like to hear your thoughts on that.

I don't think any of us has an answer today, and I don't know if there are any air district people out in the audience, I hope there are. We certainly reached out to them all for this hearing today, but I just see that, in

identifying policy issues for this agency's report that seems to be an issue we need to grapple with.

I don't know what your thoughts are.

MR. SCHEIBLE: I think we might have consistency between regions, because the air doesn't stop at the boundary line, and the pollution impacts continue downwind.

I think there's always going to be cases where, when the wind blows from the Pacific Ocean generally inland and a source is located right on the eastern boundary of one air district, it's clear that most of the time the emissions go into another air district and that district may have a different point of view of the acceptability of where the mitigation occurs.

And some of those will probably have to be worked out through things that complicate the process. But make it so all the agencies can say yes, having this project is consistent with our air quality goals in protecting the impacts on the region directly.

I don't know that there's any perfect solution.

CHAIRMAN BOYD: I've just kind of noticed the absence of dialogue between the three

sets of parties that I referenced earlier on these kinds of issues, and hopefully after today we can have more discussion.

CHAIRMAN KEESE: Let me ask the question that's been up here a couple of times another way. If we look at the average emission levels across the country we're probably at 90 parts NOX. Over the last five years I've watched the limit go from nine down to two and a half, and we're talking two right now as a potential.

Is there a point, when you get to two or one -- I'm not trying to pick a number -- and you say enough's enough? We've reached the level where that's it?

MR. SCHEIBLE: Zero sounds pretty good. I mean, when you look at the analogy with the vehicle program, I mean we are searching for the technology that enables us to move around and have mobility and yet have zero emissions. So --.

CHAIRMAN KEESE: So, more likely I guess -- to go back to your earlier answer -- it will be dependent, cost-dependent --

MR. SCHEIBLE: I think it's dependent on costs.

CHAIRMAN KEESE: And you just keep

lowering it as long as it stays in the realm of reasonable cost?

MR. SCHEIBLE: Right. I think if someone, 15 years ago, had told me or the now-veteran staff at the Air Resources Board what kind of levels we would be achieving for NOX, for combustion sources, we would have said well, that's perfectly fine.

But what we've learned is that we've been very successful in terms of applying the technology. We've even got some plants in Mexico to apply some technology so that they come at least close to California levels. And air pollution's a major impact from these large power plants.

So when you're talking about spending a single digit in terms of the total cost of the plant to get to these levels, it seems to us to be a reasonable choice to mitigate one of the major environmental impacts that the plants have.

But, on the other hand, we don't just link technologies together without consideration of the fact that you get diminishing returns, and at some point it becomes so expensive it doesn't really make sense to require the next level until

the technology gets cheaper.

CHAIRMAN KEESE: Okay, thank you.

CHAIRMAN BOYD: I guess a little detail like achieving the air quality standard is always the ultimate goal. I also recall, when we started this about 20 years ago, there were about 20 million people in this state. Now there's 35.

MR. SCHEIBLE: And I think we've got to plan for 50 and above.

MR. SADREDIM: Hi. My name is Seyed Sadredim. I'm the Director of Permit Services with San Joaquin Valley Air Pollution Control District. I had a couple of questions for CEC regarding environmental justice.

First, I was just wondering why CEC doesn't have an official policy, and whether you are in the process of putting something together. For instance, would you be following what CAL-EPA's developing for state agencies?

MR. BEYER: Well, recent legislation did set up the California's -- well, excuse me, the governor's Office of Planning and Research, as the coordinating agency for all state agencies and certainly CAL-EPA, has its own guidance through current law.

Which they're moving very rapidly on to develop environmental justice policies and such for their boards and offices and departments. The Energy Commission does stand off on its own, in essence, because there has not been any legislation that has been written that is directed at us specifically, or includes us among others.

To this date we are still basically doing the right thing as far as doing environmental justice analysis, because it is, among other things -- we oftentimes, as being discussed here and we all realize -- we have a very direct relationship with air districts in the siting of power plants.

And it's my understanding, at least, that under delegation from EPA, air districts for PSD permitting would do an environmental justice analysis.

And, although I have not been involved in the discussions to date regarding specifically how the Energy Commission does its EJ analysis in place of the air district on siting of power plant cases, that's in effect what happens. Because our EJ analysis is a much broader scope analysis than air district alone might do.

But back to your first question about the EJ policy for the Commission. It hasn't been a great need to date, because we are in fact doing an EJ analysis of every project that comes before us through the Siting Division's approach, which has been certainly briefed to the Commission Siting committee, at least.

And Commissioner's are aware of it and accept it. But it is not a fully adopted policy in essence for the Commission.

MR. SADREDIM: Coming from an air district viewpoint, we believe that CEC is in a better position to do environmental justice on these projects, because you have the greater scope of responsibilities -- that more or less get into the land use decisions even -- to the extent that the state can get involved. But that you have siting, for instance, authority.

And we believe that the EPA policy that, primarily, you're following, is not sufficient to protect the environmental justice concerns in all cases.

Because you're only looking at one particular source, and if you don't expand your EJ approach -- for instance, like ARB has, where you

have other components other than just permitting one single source. You're looking at programmatically what you could do to reduce emissions from existing sources.

Which brings me to the second question. If you have a facility going in, and their emissions are within the legal limits of, let's say, a local district slip. And the risk is acceptable, but there is a disparate impact on a particular population -- both from this facility as well as existing sources -- would you do anything to deal with that situation?

MR. BEYER: Well, I kind of did mention in the presentation that I made that our analysis is a CEQA-based analysis, and that's still the majority of what we do as far as our air quality analysis.

It is based on CEQA, and what we're looking for is to find out whether or not there is -- actually, somebody else could better speak to this, one of our air quality specialists, which I am not -- but we do look to see whether there is a significant impact on any population in the area of the project.

If the answer to that is no, then the EJ

analysis is pretty simple. It just says that, without a significant impact there is no EJ issue. We may have an EJ population, and we do look certainly at cumulative impacts as well as direct impacts of the project.

I think I indicated that the CHAPIS program will help us, because one of the issues that comes up from communities -- and it seems that's what you're getting at to a degree, certainly, and it looms very heavy right now in terms of what ARB is doing in considering cumulative impacts on communities -- because what we're largely talking about with EJ is communities that are already overburdened with pollution from whatever sources those are.

And that's been a area that many agencies, not just the Energy Commission, have had some difficulty with properly accounting for those other emissions types, and in general the total impact on a community. But that's where CHAPIS really will be a benefit, and I'm glad to see it coming along.

So at this point in time I think we're largely looking at our particular project, its contribution to what's already there, and the idea

about what is already there is difficult in some cases because you may not have stationary source monitors in the near vicinity and you're doing some extrapolation between somewhat distant source monitors.

And that's been our difficulty in some cases, in recent cases in fact, where we don't even have any current information about what the ambient air quality is.

MR. SADREDIM: Thank you. Basically, as a comment, we believe that it is not -- the EPA's policy is not sufficient to deal with the EJ issues in that you only look at a particular project or maybe do a cumulative analysis and look at a few -- if you don't have a broad policy to look at all the power plant sitings, for instance, that go over the years in a particular area being your responsibility and doing something to mitigate the existing emissions also from existing power plants and other sources.

One source at a time is not going to get you to where you need to go with EJ, so our suggestion is to develop a formal policy at the CEC level that would look at EJ in a more comprehensive fashion.

MS. ALLEN: Commissioner Boyd and Chairman Keese?

CHAIRMAN BOYD: You had one more question out there, are you --?

MS. ALLEN: Well, this is a followup to the question. The Commissioner's are the policy setters here. So did either of you have anything that you'd like to add as far as the concept of a Commission Environmental Justice policy?

CHAIRMAN BOYD: Well, not at this time. I think the purpose of today's meeting is to soak up some of these thoughts -- and hi, Sayed, I didn't see you out there initially, it's been a long time -- but I would appreciate, as would staff, any specific additional written comments you might have on this matter for us to consider before we finish our work on the Integrated Energy Policy Report.

So I'm not going to make any policy pronouncement today. I heard the differing points of view, and I think that's healthy.

CHAIRMAN KEESE: I -- that was a very firm recommendation for something we should do and so we'll obviously consider whether we should have that in our conclusion.

MS. ALLEN: Okay. Were there more questions or comments from the audience?

MR. CARMICHAEL: Good morning, my name is Tim Carmichael, I'm the Director of the Coalition For Clean Air. Thank you for the presentations. A couple of comments. Just following up on the exchange that was just occurring there.

We would certainly like to see not only the CEC follow ARB's lead on environmental justice policy, but the whole agency, the resources agency, follow Cal-EPA's lead. And I know there is a state program underway, but the resources agency as a whole could be moving more quickly on it than it is, in our opinion.

And one more comment on the specific situation that is arising not just with power plants, but with all sorts of heavy industrial facilities throughout California. I don't believe that it's as much a question of what are the emissions in a given community -- though there's more work to be done there.

It's really, the greater challenge it seems for our communities is what do we do when a facility wants to come in to a highly impacted

community? Do we allow them to come in, or don't we. And if they do come in, under what circumstances?

And those are the debates that are currently -- you know, there's a task force at the South Coast Air Quality Management District today working on how do you react, what is the policy in that situation. And I think that's the greater challenge for California as a whole.

I think we've done a pretty good job of measuring emissions -- not necessarily getting it out to the community, but measuring them we've done a good job. I have a couple of specific questions.

On the CHAPIS presentation, there are a couple of things that weren't clear. We are one of the organizations that have been encouraging this project, and we're very happy to see it coming on line. But just a couple of quick questions.

You said you were going to start with facilities that are over the ten ton per year for criteria pollutants. It was my assumption, but it wasn't clear -- you will for those facilities communicate all of their emissions, including

their toxic emissions? Or only their criteria emissions?

MS. WELLER: I think what we've worked out in collaboration with the California Air Pollution Control Officers Association is that for those facilities that emit ten tons per year of criteria pollutants, their emissions are quality assured well enough that those criteria pollutant emissions would be on the map.

You could still access their toxic emissions when you use that web query tool, but the map itself would initially show just their criteria pollutants emissions. And that for toxics we would be looking at the other source categories that I mentioned.

MR. CARMICHAEL: Okay. Thank you. What will happen initially on the map if you run your mouse over a point, or over a port or an airport?

MS. WELLER: At this time, most of the port or airport emissions are included in what we called our off-road inventory, our other mobile sources.

And the way that we're handling those categories is as I mentioned, we take estimates that had been made -- sometimes they've been made

at the county level, but we may know which airport or port they occurred at. And they are spatially distributed on the map into the grid squares.

So, at the finest resolution at this time that you'd see for them would be the kilometer or two sized grid square. And we are making an effort to make sure that they fall into the correct grid square, if we do know that the emissions arise from a particular port or particular airport.

We actually -- that's something that is a major focus at the Air Resources Board. Because of the concern about diesel emissions, that they are often some of the highest risk emissions in the state, we are making a special effort to get better inventories for the ports and the airports in particular.

MR. CARMICHAEL: And, I should have added, large trucking distribution centers would fall under the same scenario?

MS. WELLER: That's right. That's another category that we have an effort under way to try to get better emissions, more localized emissions inventories for those types of sources.

MR. CARMICHAEL: One more follow on

CHAPIS. What will happen if you highlight a freeway?

MS. WELLER: Again, right now, in this first phase, the vehicle emissions are handled by grid squares, because the original estimates are made using the models at county levels.

What we are doing in the second phase, as we move towards the risk-based maps, we have an effort under way again, to improve the scale of the emissions inventory.

So we will be developing -- at least for the major freeways, highways, major arterials -- we have an effort underway to develop allocating those to the actual links on which they occur. Initially though the map will start with these grid squares for the emission phase.

Our longer term goal is to do -- as I mentioned for these other categories -- our longer term goal is to get more localized emission estimates for those types of things, including the links and the roadways.

MR. CARMICHAEL: Thank you. It goes without saying that the environmental justice and the environmental organizations are very excited to see this project progressing. I heard some

sighs and moans in the audience when you were presenting, but I think those were sighs and moans of joy.

Just a followup to something, and I apologize if I'm getting ahead of your schedule here. But I think this is appropriate to bring this up now even though it may relate to the next set of presentations.

And that's the air quality impact of power generation outside of the state of California for power used in california. We had an e-mail exchange last week or the week before about this, and I was quite surprised to see that that wasn't part of the analysis or discussion that's taking place today.

And I think, for me it's abundantly clear that we have a responsibility as a state to understand the air quality as well as the broader environmental impacts of our power use in the state, even if it's not being generated in this state.

And I looked briefly at a presentation that's upcoming and it notes that there's significant generation in power supply coming from outside of our borders, but I'm not sure that this

agency, the California Energy Commission -- or the Air Resources Board for that matter -- is taking a good look at what the air quality impacts are of the power generated in other states for use in California.

I believe that has to be part of our ongoing analysis, part of our -- you know, one of the tools that we need, the information that we need, to make a determination as to what are we going to do for the future power mix.

It's a big topic of discussion today with the Los Angeles Department of Water and Power, with more than 50 percent of their portfolio coming from out of state coal. And we are taking them to task on that. That they cannot, on the one hand present themselves as a green utility, and have that in their portfolio.

On the other hand, as they look to a plan for the future they cannot ignore those impacts. And I don't think this agency -- CEC cannot either. And I encourage you as this effort progresses, that that be part of the analysis and part of the information that is captured, as we evaluate the impacts of energy system. Thank you.

MS. ALLEN: Thank you, Mr. Carmichael.

Are there other questions or comments from members of the audience? If not, that concludes Part One. We're ready to move on to Part Two.

The first presenter is Larry Hunsacker, an engineer with the Air Resources Board's Planning Division. This came in as a late handout after 9:00 this morning. It looks like this. The bottom slide says "passenger car, truck emissions." Go ahead, Larry.

MR. HUNSAKER: Larry Hunsaker from the Air Resources Board, working in the emission inventory branch. I'm going to give sort of a brief overview of the inventory. I'm focusing on some of the energy-related inventory that we have, inventory at the Air Resources Board.

This gives you an overview of the relative impacts. Although the ROG plus Nox emission levels may not mean much to you, the trend itself, over the years, starting in 1990 to 2010, and also their relative impacts with each other, hopefully provides you some information.

Passenger cars and heavy duty diesel trucks, the first two there, the red and the blue lines, those are the on-road fleet, which is a centerpiece of the Air Resources Board. We've

focused our controls on this source extensively.

The green line is farm and construction equipment. It deals with a lot of small engines that are not necessarily well-controlled, and there's so many of them that they provide a significant emissions source.

And the last two, petroleum industry and power plants, those are definitely energy-related sources. The petroleum industry being the source of our fuels, which drive our economy, and power plants, of course, being the source of electricity.

As you can see, the trends generally show a decrease. As I look at each of these individual sources on their own slides you'll be able to see more clearly the impacts that each of them have as far as the trends are concerned.

MS. ALLEN: Larry, before you leave that slide -- ROG, reactive organic gases?

MR. HUNSAKER: Oh, yes. And another word often used is VOC's, volatile organic compounds. That was a ROG plus Nox combination, which is generally associated with, it's a precursor for ozone.

And although I only show the ROG plus

Nox emissions on these slides, the PM10, which is important for diesel particulate matter -- although I didn't show the actual numbers, the trend is generally the same. So you can see that the trend will also follow this particular line.

Passenger cars and trucks, as you can see, were a very large source in the 1990's. They definitely dominated the inventory. It was the focus of the ARB to reduce these emissions.

We've achieved this through several means. End-use requirements, for example, such as smog checks for cars, on-board diagnostics to inform drivers of problems, and smoke inspection programs for trucks, recall for vehicles with faulty emission control devices.

Specifically we have the LEV, the Low Emission Vehicle Program, which was adopted in the 1990's. It established several types of vehicles. LEV's are low-emission vehicles. Ultra-low emission vehicles, ULEV's, and zero-emission vehicles, the ZEV's -- electric vehicles and fuel cells.

Generally speaking, these reductions have given us significant reductions all the way down to 2010, and the LEV II program, which was

adopted in 1998, it tightened Nox standards for all of these different types of vehicles. It added a new vehicle type, and SULEV, which is sort of an intermediate between the ULEV and the ZEV.

It also helped tighten the evaporative emissions from these vehicles, and it extended the lifetime or the durability of the controls, so that way they would last longer. Hoping to last the entire lifetime of the vehicle.

California vehicles tend to be operated sometimes well past 100,000 miles, so we want to make sure these control systems at least last that long. In general, the growth from vehicles is associated with population and the number of vehicle miles traveled is increasing.

And to ensure the emission reductions that we see here -- these control levels and these control systems are required. And this is an interesting trend. You can sort of see the hump there.

And the reason for that, in 2000, is due to something that occurred with software. It's a testing program that was used for heavy-duty fleet. And somehow the manufacturers were able to make the engines -- I guess you'd call it sort of

a defeat technology, or a cheating if you will -- of the system.

And they were able to indicate that they were achieving the standards, but in reality, in the actual operating of the fleets on the road, as you can see, they were not really achieving the standard.

This is one thing that we're dealing with, is an acceleration of software upgrade to these testing programs or testing systems that will prevent this cheating ability. And the trend does show a decline all the way into 2010. That's definitely important.

In 1997, USEPA adopted a two gram Nox standard, that's where it started. And then in 2001 they adopted a diesel truck emission standard which will be phased in between 2007 and 2010 at the very end there. It's reduced emissions almost 98 percent from uncontrolled levels. That's very significant.

On-board diagnostic systems and manufacturing recalls are also part of the heavy duty diesel program. And once again, the number of vehicle miles travelled is increasing for these vehicles. And the strong controls imposed by the

USEPA and the ARB will keep the emissions from this category in a decline into the future.

At least this category is showing a decline, although it sort of has a strange shape to it as well. 75 percent control on the engines coming in and it will be fully phased in in 2008, is what the USEPA has established. And additionally, in April of this year, they proposed an anticipated next phase for the federal offroad engine standards.

This proposal would reduce emissions by an additional 90 percent over what they already are. Again, this is a category that's linked to population in many cases. And for the farming side it's linked to harvested acres. Because these are continuing to increase we need to have strong controls in order to keep the emissions from going up.

And the petroleum category includes not just oil refining but it also includes the distribution network for natural gas, diesel, and gasoline fuels. Gas stations and bulk terminals have a high evaporative content to their emissions.

This is an important part of the

petroleum industry. And the growth for this category is generally determined by the local districts and their estimates of what they think the growth is likely to occur.

And the CEC has a part in this as well. Controls in this category are very strong. The districts tend to control well the oil refineries and the distribution networks. Obviously, in the future, you can see that it's a flatline sort of showing how growth can overtake controls if control programs are not aggressively pursued into the future.

We can't just give up now that we've achieved a good level. We have to keep pressing forward. And then power plants-- you can see the emission levels here only go up to 180 tons. So that's perhaps the smallest of all categories here. But often because they are local point sources they can be very significant for local air pollution concerns -- health risk and what not.

This category, towards the end here, you can see that it's also increasing, actually. And this shows how important it is to keep emission controls strong and aggressive into the future. If you give up too early this type of a trend can

occur.

The ARB is addressing this particular issue with some guidance documents that will assist the local districts in controlling power plant emissions. And that will be discussed later by Chris Gallenstein. I guess -- that's pretty much the end.

MS. ALLEN: All right. If there are questions for you they'll come at the end of this part. The next speaker is Matt Layton of the Energy Commission staff. He's an engineer in the Systems Assessment and Facilities Siting group.

He deals with power plant licensing from the air quality perspective. And he'll be giving an overview of electricity system and trends.

MR. LAYTON: Good morning. My name is Matt Layton. I'm with the air unit of the Systems Assessment and Facilities Siting Division of the Energy Commission. I work with air districts, power plant developers, the USEPA and the Air Board in analyzing air issues associated with power plant sitings.

Today I'm going to talk a little bit about the relationship between California in-state generation emissions -- I guess, California in-

state electricity generation and air emissions. What we've found is that California's electricity generation system is relatively clean, and will continue to get cleaner.

We're talking about air emissions, not air quality. Air quality is a much more complicated responsibility for the Air Resources Board. All we're looking at is just the emissions from this sector.

What we have found is that Nox and PM10 are the indicator pollutants, the pollutants that we're most interested in from the generation sector. As alluded to in prior presentations, CO and VOC's -- ROG's -- are less critical, and less critical from the generator sector. Location of the emissions matters, though.

What we're talking about here are just general or statewide numbers. That doesn't suggest that power plants cannot have a significant effect in a local area. We're trying to just present gross trends. Each power plant itself should be considered for local impacts.

What we're showing here are just the gross trends. In the 2001 Environmental Performance Report we pulled together Nox and PM10

numbers for the generation sector, and compared them to total inventories.

What you can see in the Nox area is that Nox emissions have gone down from the generation sector from about eight percent to about two and a half percent or two percent. That's a significant improvement, especially considering that Nox numbers in total have also decreased.

So the Nox decline is much steeper than the overall Nox decline from the entire state inventory. For PM10, it's a very small contribution to the overall inventory.

But one thing that's interesting about the PM10 numbers -- if you look at the very bottom line, which is probably very hard to see -- but the total percentages really jump around.

This points out the problem with databases. The numbers in databases always aren't 100 percent accurate. So rather than just look at the total numbers, I think what's important here are the trends and the relative percentage of these Nox and PM10's to the overall inventory.

And you can see what power plants contribute in the way of air emissions to our air quality overall. Where do the generation sector

emissions come from?

This is pulled from the current version of the Environmental Performance Report that's in draft form. There was a similar presentation in the 2001 Environmental Performance Report. This shows how our generation sector has evolved over the years.

The bottom bar, the blue, is the hydroelectric system. The purple is the gas or oil, it's dominated by gas. The yellow is the nuclear, and above that is the co-generation gas, and then some smaller components up above.

You can see that between the co-generation gas and the oil and gas power plants, our capacity -- not our energy, our capacity -- our capacity is dominated by gas.

Also we have a large but variable hydroelectric system. Even with about 60,000 megawatts of installed capacity we do rely on imported energy. We get a lot of coal and nuclear generated electricity from the southwest, and coal and hydro-generated electricity from the northwest.

What's important to note here also is that the instate generation number, which is about

85 percent on this particular figure -- which is for 2001 -- does include electricity that's generated by coal plants located out of state that are owned by instate power plants.

In some years we can get as much as 30 percent of our electricity imported from out of state. What's really interesting about this particular figure is this is for 2001, and there was a drought instate and out-of-state. You notice that between the southwest and the northwest imports fell to about 15 percent, which is much less than the 30 percent we might get in a very good year, for imports.

California also imports a lot of oil and gas. We import about 50 percent of our oil, and about 85 percent of our natural gas. So California relies a lot on imported energy. This provides a lot of benefit, because in some years we can get cheap imported power and in other years we can also supply or export power to other regions of the western United States.

We have a system that relies a lot on instate generation and also out-of-state generation, with imports. How it operates in any one day -- this is just a typical demand profile.

What you can see here, that somewhat imports load follow, but definitely the gas units and the hydro units located instate load follow. They go up and down with the load every day.

And then at the very top, on those really peak days, say in the summer season -- which is also the ozone season -- you will get peakers that will come online as well. They don't operate all the time, but they just come on for those few hours during the day or some days they don't come on at all. But the majority of the load volume occurs in our gas system.

This is a little more detail looking at the energy now, which is different than just the installed capacity. But what's interesting about this -- at the very top, which is the imports, and the very bottom, which is the hydroelectric instate -- the last few years, say from '98 to 2001 the imports really diminished, and also the hydro decreased.

This was due to a drought instate, which affected our instate hydro. And out-of-state, which affected imports. What made up most of the generation or energy needs were in the purple, the gas generation.

This is a little bit more detailed look at that hydro and import swing. What we have here is some data from EIA, which is the Energy Information Agency. And on the bottom two, you can see the purple is the instate hydro, and the red is the instate gas generation. They diverge.

When we start to lose hydro we have to increase gas. We can see that the fuel or fire generation does increase. At the right top you can see that CO2 has increased.

I'm not talking much more about CO2 here other than to say we'll talk about it this afternoon. But obviously, increased reliance on fueled or fossil-fired or natural gas-fired generation will increase CO2 emissions.

And in the middle is our electrical demand. It's fairly flat. But what's interesting about this is that the hydro and gas curves are much steeper than, say, the demand curve. The demand curve is increasing over the years, except for some conservation, say, in 2001.

This figure contains the same charts for gas and hydro. What's also shown on here are the nuclear and other sources of instate generation. They are flat over the years. In other words,

they can't respond to shifting demands or shifting availability of power instate and out-of-state. They are base-loaded, and what we have to do is turn to our other installed capacity which is primarily gas.

This is the installed capacity -- this is not energy once again. Our installed capacity that is fired by some kind of fuel. It's not nuclear or hydro or wind. It is primarily natural gas.

We do have some other fuels that we use. We have some coal and petroleum located instate. Ag and wood waste, MSW, refinery gases. What is important to note about this is that the fuels like coal, and petroleum coke and refinery gases -- they're pretty much base-loaded. They are cogenerators operating -- under their contracts, pretty much base-loaded. So the swing fuel is natural gas.

Now that I've shown you that we do rely on natural gas as our swing fuel, does that cause us a problem instate for emissions? This is out of the 2003 Environmental Performance Report. This is data from the USEPA's E-grid database.

These are Nox numbers for '96 through

2002. Even though we had an increase in natural gas use in the state, an increase in megawatt hours generated in the state, we actually had a decrease in Nox emissions in the state from the generation sector.

We think that's significant, and we think that is reflective of the clean additions that have been added to the system. We think that is also reflective of controls that have been implemented over the years by the districts and the Air Resources Board.

One thing you'll notice here is that 1999 date is missing. E-grid had some quality concerns about that particular data. Again, this highlights that databases should be viewed with care. The absolute numbers may not necessarily give you the best picture. I think the trend and relative percentages of those numbers to each other are perhaps more important than the absolute number.

This is PM-10 for those same years, '96 through 2002 -- again, 1999 is missing. The emissions factors for PM-10 from the generation sector are relatively small, so therefore I think it's hard to even find much variation. There is a

slight downward trend, but again the numbers are small, therefore it's not necessarily outside the range of error. But, anyway, it's a good trend.

In the 2001 EPR we went back through '75 and I tried to pull up the emission factors for the generation sectors. And this is for the fuel-fired generation. This does not include nuclear and hydro.

And what we found is a marked decrease in the Nox number from '75 through 2000, and also a decrease in the PM-10 number. These are emission factors on a pounds per megawatt basis. Part of this is the system is becoming more efficient, so you get more megawatt hours per pound of pollutant.

Also, controls have been implemented. Also the system has been shifted from some oil to almost exclusively natural gas. We have had discussions with the Air Resources Board about our numbers. There is some differences. I think, rather than say who's right or wrong, I would highlight the trend. And we will continue to work with Air Resources Board trying to make sure we come up with the best number.

I think this will underscore the need

for good data as always a requirement. I think Mr. Scheible pointed out that inventory on this pyramid -- inventory information was one of his key components. And we agree, we'd like to know exactly what the inventory is, and what sources contribute to those inventories.

Again, to highlight Nox and PM-10, from the generation sector. The generation emissions are small. The emissions factors are decreasing. And even with increased generation instate, which should increase Nox emissions, we actually saw a trend down in Nox emissions.

But i want to say again that we're only looking at instate generation. We're looking at statewide emissions and emission factors. A particular power plant can dominate an inventory in a particular area.

For example, a rural area that doesn't have a lot of industry or a lot of freeways and cars, the power plant may be a large contributor to the overall inventory.

Mr. Carmichael talked a little bit about the concerns about out-of-state power. We too are concerned about out-of-state power. However, I think it's very important -- location does matter.

If you have emissions in a relatively clean area, and those emissions do not lead to or contribute to a violation of a state ambient air quality standard, it's hard to say that that power plant is causing health effects.

California has a lot of people, a lot of cars, a lot of industries, and therefore we do have a lot of emissions and, in a lot of cases, bad air quality. Therefore, the power plants do contribute.

Out of state, some regions are very rural and therefore it's dangerous to assume that a coal plant -- because there is a stigma associated with coal plants -- are bad. I think it's really dangerous to suggest that the coal plants should be done away with.

Yes, they need to be controlled, yes they need to be -- visibility needs to be addressed, mercury needs to be addressed -- but because their emissions are higher than, say, an instate power plant, doesn't mean that it's causing health issues associated with air quality standards.

Backing up a little bit. We have a very clean system. I'd like to discuss a little bit

how we got here, from just in the power generation sector.

One of the keys -- in the early '90's, CARB and the air districts initiated a Nox retrofit rule, looking specifically at the large utility boilers. They were the -- they owned all the generation at that time.

A lot of activity in the way of generation construction had occurred in the 50's and 60's and 70's. These boilers had opportunities for significant reductions. During the divestiture proceedings at the Public Utility Commission the EIR concluded that these Nox retrofits were necessary and important.

And therefore they were, and the EIR concluded that the rules had to be applied regardless of ownership. So some of the rules were changed, such that they applied to any owner, not just the utility. And those reductions have occurred over the last few years.

Again, that shows up in the emission factors that have decreased, and also the Nox emissions that are decreasing. To reiterate, most generators in the state use natural gas, which is cleaner than oil or distillate or coal. And along

those same lines, CARB is now preparing a new guidance document, looking at the existing system.

The last retrofit rules did not look at some of the turbines. This time through they are going to look at turbines. It should pose some interesting questions, because a lot of these turbines are peakers, and they're very low capacity.

Therefore, the cost-effectiveness may be subject to great debate. The emissions are not very significant. The plants are relatively dirty, but because they don't operate much they don't have very much in the way of emissions.

Also, they have tremendous utility within the system. They are there for those important one hour a day, one day a year events. It's going to be an interesting issue that the ARB and the CEC will have to look at in great detail.

We expect the trends for the generation sector to continue. New generation is much more efficient. New generation will be very clean, especially as districts continue to apply the new source review, which requires best available control technologies and offset requirements if the power plant does trigger the threshold.

CARB is also updating their guidance document, which deals with BACT and offsets for those new generation sources. Again, natural gas continues to be the fuel of choice, which is relatively clean fuel.

We also have renewable portfolio standard. By 2017, 20 percent of our energy is supposed to come from renewable sources. Some of that renewable energy will be cleaner than the system, some may be as clean as the system, depending on whether it's natural gas or biomass or photovoltaics and wind.

Also, CARB has recently completed a certification standard for exempted distributed resources. They are supposed to be as clean as current central station, which is very clean.

There's a window right now where the standard is a little bit less stringent. By 2007 these distributed resources will be as clean as central stations.

By the way, this is my last slide. I started off talking about air emission. And basically, most of my talk has focused on Nox. Again, I think -- from a generation sector's point of view -- it is the most important. And also I

think this highlights why we think we're going to continue to see improvement.

If you look at the third bar down, it's out-of-state coal at five pounds per megawatt hour. Everything else below it is all cleaner than that. So our system is clean, it's cleaner than out-of-state, but we have significant air quality issues that we have to address.

By the time you get down to the modern combustion turbine combined cycle -- which is the third bar from the bottom which you can't see -- it's .06 pounds per megawatt hour. Over the last four or five years I think we've permitted about 60 plants at that level.

And there was the possibility for the renewables -- which are fuel cells, demand-side management, wind, photovoltaics -- which are even cleaner than that.

The fourth bar up is the retrofit rules for all the boilers, at .15 pounds per megawatt hour. Those boilers are as clean as the combustion turbine, but they are about half as efficient. That's why the number differs so significantly between the combustion turbine and the boilers.

Anyway, we see the trends continuing for the generation sector. We strongly encourage that districts continue to apply rules, new source review rules to the power plants as they get permitted. We do not see any room for backsliding.

We think that the success story to date is very encouraging, but should not be allowed to deviate. We are going to take a strong interest in working with CARB on these new retrofits on the turbines, because of the implications for the system's reliability.

Also, we always encourage better data. Every time we go to a database, whether it's from our sister agency or the USEPA, we do find that there are deviations. And therefore we would hope to get the best data possible such that we can attack the problem. Thank you very much.

MS. ALLEN: There's been some interest in whether we were going to talk about overall outlook and forecast for the electricity system over the next five to ten to twenty years. That won't be a topic today, but it will be addressed in a couple of other workshops this week. Al Alvarado can talk briefly about those workshops.

MR. ALVARADO: At tomorrow's workshop we're going to be covering one of the staff draft reports -- it's not draft report at this point -- staff reports on the electricity infrastructure assessment.

And in this staff report we consider a number of different scenarios of varying demand trends, hydro variability in the system, and different scenarios assuming different growth rates for the use of either demand-side management programs or renewables.

The purpose of the workshop that we're going to have tomorrow is to discuss the findings and the variations and potential implications to the electricity system. So, that's my plug for tomorrow's workshop.

If you're interested in taking a look at the report we do have that report posted on the Commission's website.

MS. ALLEN: Is there a workshop scheduled on the 12th?

MR. ALVARADO: Let's see. Tomorrow we have the one on electricity, on Wednesday is the followup on natural gas implications, since hazmat had indicated any variations in electricity

generation will affect the demand for natural gas.

On the 12th I believe is on energy futures, and --

MS. ALLEN: That's it, energy futures. It'll be in that workshop where there will be a discussion about overall prospects for supply and demand balance and the broader picture of electricity and other energy sources, is that correct?

MR. ALVARADO: Yes.

MS. ALLEN: Okay. Thank you, Al. I neglected to mention something related to the overview of the electricity system. It relates to the out-of-state picture. Last week I received a letter from the Imperial County Air Pollution Control District's staff expressing their concern about emissions affecting the Imperial County and other areas in California that would be originating in Mexico.

They're focusing on three new electric power plant units that are under construction in the Mexicali area. I'm not going to read the letter out loud because it was three pages long. It has been docketed, and it will be part of the Commission's public record.

If you'd like to have a copy of the letter let me know and I'll get you a copy later today.

The next presentation is on transportation energy trends by Gerry Bemis, who is an engineer in the Energy Commission's Transportation division.

MR. BEMIS: Thank you, Eileen. I'm going to speak about some ongoing work that has been two or two and a half years in the making. Commissioner Boyd, you will kind of have to bear with me -- because he's been involved all along with us in this process.

It's a joint project with the California Energy Commission and the Air Resources Board, which he's pretty familiar with. Before I get started let me fill in a couple of little gaps that I saw while I was listening to the presentations.

Transportation does contribute to emissions in California, and has been significantly -- and the gentleman did show some slides with the emissions reducing. It's a small percentage of the total emissions and getting smaller.

Honda, for example, they say that their cleaner cars, the air coming in to the engine is dirtier than the air going out the exhaust. That's how clean new cars are today in the dirtier areas of California. Those cars are extremely clean, and they're actually reducing pollution by consuming air, ironically as it seems.

I'm here to talk about what's happening with energy trends in California, and I hope that this works. I'm going to start with this chart right here that shows California's consumption of gasoline and diesel. The vertical axis is in billions of gallons of energy equivalent gasoline.

So we convert the diesel consumption to equivalent energy units of gasoline and all that together to get the solid black line there. And then we extrapolate that out beyond 2020. The forecast is for 2000-2020, and then we extrapolate it out into the future to see what the far distant future looks like.

The red line shows, on the other hand, our on-road supply from California refineries. That's what our production is instate. And we can see, beginning in the 2001-2002 time period, we're starting to become a new importer of petroleum

products. This is not crude oil, this is petroleum products.

In the past we have been an exporter, and in fact we do export from time to time, but on an operational basis they do both imports nd exports. But on the average over the year we're becoming a net importer of gasoline and diesel products.

As that supply/demand gap grows, the first choice is probably to have increased refined product imports, as the bottom vertical line shows. And then the question becomes will that be enough or will we need to go further and actually displace the projected petroleum demand.

And that's what the study was all about, how can we find ways to reduce that projected demand. We're directed by AB 2076 legislation. Somebody named Shelly was the author, to forecast gasoline, diesel, and petroleum consumption in 2010, '20 and at least 2030.

The Energy Commission and the Air Resources Board were directed to work together to prepare this report to the governor and to the legislature. We've had an extension to the report due to ongoing issues like turmoil in the Middle

East, and we're about a year, year and a half behind schedule, but the intent is to adopt the report hopefully by the end of June by both the Air Resources Board and the Energy Commission.

The report will contain a recommended strategy for reducing our petroleum dependence. And it will show statewide goals for reducing the rate of growth of consumption. In a parallel effort the Energy Commission is looking at the feasibility of operating a strategic fuel reserve, and I'm not really going to talk about that any further because basically I wasn't involved in that.

It's another way of looking at short-term issues. What can we do to mitigate price volatility effects? And would operating a strategic reserve enable us to control price spikes? We looked at these factors -- economic factors, petroleum supply issues, and environmental effects.

Higher gasoline and diesel prices reduce the buying power of consumers and drive up the average cost of goods and services delivered by truck transportation, for example, and causes problems for all of us. Petroleum supply

disruptions increase the vulnerability to external, increase vulnerability to external supply disruptions and geopolitical instability from foreign sources.

What that means is those disruptions cause us to worry about our supplies and causes us to have higher prices. They were concerned about the possibility of cutting off supplies from unstable foreign sources. So we looked at, and we applied a premium to, the externality issues associated with petroleum supplies.

Regarding environmental effects, we're worried about the trends in petroleum consumption causing greater risk for eco-system damage and water quality and air quality and climate change effects that we talked about earlier. Here are some of the results that we had.

The vertical axis -- given the quality of our projection system you probably can't read that, I can't read it from here -- but we looked at a variety of efficiency options, to improve the efficiency of using gasoline and diesel in our on-road trucks.

And we tried to estimate life cycle costs associated with those operations. And we

tried to take a look at improved technologies.

There was some work done by the ACEEE. They looked at several types of packages of technologies that could improve the operation of on-road vehicles -- fuel efficient tires, weight reduction, aerodynamic improvements, more efficient engines -- things like that.

And they put together combinations of packages, and we evaluated the cost-effectiveness of those packages. And we found that some of them -- the bottom bar here is labelled ACEEE moderate, which would achieve about a 30 mile per gallon on-road average, compared to about a 21 mile per gallon average today.

So you could see almost a 50 percent increase in fuel efficiency with that technology. And at a cost, and when you compare the savings in fuel expenses over the incremental costs of those technologies we find that it would actually save money.

The ACEEE advanced would achieve about a 34 mile per gallon on-road fuel economy, and that is even more cost-effective. In other words, the cost of that was smaller than the, the fuel save was even greater than the cost, so it came out

even further on the positive side.

Then they looked at hybridization, which is a combination of electricity and gasoline in the power. And we can see that there was a mild hybrid and a full hybrid. And that has to do with the ratio of the electrical portion to the gasoline portion.

A hybrid vehicle has both an electric motor and a gasoline motor and in some cases they operate at the same time, and in other cases they operate independently. In some cases the electric motor operates and there's no gasoline motor.

Anyway, the hybrid technology has in part a significant cost associated with the battery, and there is uncertainty about what the future cost of that technology is going to be. And so we see two different capital costs showing here.

One is for the full hybrid, and the mild hybrid. One for the Air Resources Board main estimate, and one for the ACEEE estimate. And we can see that the ARB had a learning curve built into it, where they assumed in the future that the cost in batteries would come down, and there's improved cost-effectiveness for that particular

option.

Then there was a federal study that had three so-called paths. Again, those are technology paths. And they showed fuel economies ranging from 23 to 31 or so miles per gallon, again compared to 21 miles per gallon. I'm sorry, I apologize if you can't read this slide very well.

We also looked at some near-term options, as we called them. More use of fuel-efficient tires, more efficient vehicles in government fleets, improved vehicle maintenance, and also, for diesel, high-efficiency, medium-duty and heavy-duty vehicles.

And the very top bar shows diesel light-duty vehicles replacing gasoline light-duty vehicles. And many of these last few are positive, but they don't achieve much in terms of energy savings.

We also looked at fuel displacement options, fuel substitution options. Basically, alternative fuels. Starting at the bottom, using hydrogen in a fuel cell vehicle. That isn't expected to be available until at least the year 2012.

Or using methanol. And you can see that there's a wide range in forecasted price there. There's a fair degree of uncertainty. But in some instances the hydrogen fuel cell can be cost-effective.

And automotive manufacturers feel confident they'll be able to reduce the cost of those down sufficiently, so that they will become cost-effective in the future. Somewhere around 2010 to 2012.

Battery, electric vehicles are negative. They're more costly than the energy they would save. The battery electric city car, small car, turns out to be fairly positive. It does, in some cases, cross that line.

The grid-connected hybrids, that's a situation where you operate the hybrid vehicle in electric-only mode using power that's stored from the electric grid for a portion of the operation.

The upper of the two is labeled 20. That means a 20-mile zero emission vehicle range. And it shows a positive result. It is cost-effective. The 60-mile range has a much bigger battery, and it's more costly.

Then on up the graph we see natural gas

and light-duty vehicles. It comes out to be fairly expensive. Propane and butane, LPG and light-duty vehicles tends to be close to the axis but a little negative.

And then a couple of other technologies. Using E85 in flexible fuel vehicles is negative. Using a blend of ethanol -- that's where you increase the percentage of ethanol in the gasoline from the currently expected 5.7 percent up to ten percent, displacing a little bit of petroleum. That's small, if negative.

And then natural gas used in medium-duty vehicles and heavy-duty vehicles. Further up, Fischer-Tropsch diesel came out fairly positive. That uses remote sources of natural gas that basically have no value in the location because of the remoteness.

If you convert it over to a synthetic diesel and then you transport that to California and burn that in existing vehicles. That has the advantage, again, of being able to use in existing vehicles, so you can get larger petroleum reductions that way.

Lastly, on the top, using biodiesel, which itself is relatively expensive. If you use

it in a two percent blend you get a small amount of reduction but a little bit of improvement in lubricity, possibly, in the fuel. And then using it at a 20 percent blend you can see in some cases it comes out slightly positive.

Those are the technologies we used. Now here's the reductions that we get from those technologies. Starting again, the black line is the demand forecast, and the extrapolated forecast. That bright green line are what we call near-term options. That's the maintenance practices, etc.

And that one bar chart shows very small decreases in consumption. The medium green line shows the results if you use Fischer Tropsch diesel in the fleet in place of existing diesel, up to about 33 percent by volume.

Next there is the use of a 40 mile per gallon vehicle. And that shows a big decrease. That's the most efficient result by far, is improving the fleet fuel economy from about 21 to 40 miles per gallon, or roughly doubling the fuel economy of the light-duty fleet.

But you don't quite reach our goal, which is the red line down there. Which basically

is 15 percent below the year 2003's demand, or around 15.4 billion gallons of gasoline and diesel. And you don't get quite down to that line, and you don't stay down there, unless you add in some alternative fuel vehicles.

And in this case we're showing fuel-celled vehicles entering the fleet and becoming 20 percent of new vehicle sales by 2030. And that's the blue line. And even then we don't stay down there in the far future, but that's the -- the far future can be pretty speculative.

So we find that we can get down to this goal of reducing demand to 15 percent below this year's consumption of gasoline and diesel by the cumulative effects of these strategies. Even with the projected demand, as shown with the black line.

Here are the recommendations that result from the study. To reduce demand from on-road, gasoline, and diesel 15 percent below 2003 by 2020 and maintain that level for the foreseeable future.

Because the fuel economy improvement of 40 miles per gallon was based upon national implementation it would require federal

involvement. So California and other states persuade the federal government to establish national fuel economy standards that double the fuel efficiency of the new cars, light trucks and support utility vehicles.

And finally, increase the use of alternative fuels to ten percent by 2020 and 18 percent by 2030. That last part is pending, and even those numbers are pending.

Because, as it turns out, we're already using alternative fuels in our gasoline, because the 5.7 percent by volume is provided by ethanol, which is a renewable fuel. And so, we are going to be revising these numbers, and that's why I put pending on here. And that's it.

MS. ALLEN: Thank you, Gerry. The next presentation is on the status of the Commission reduction credits program by Bev Werner, who is a staff manager in the Air Resources Board's Stationary Source Control Division.

MS. WERNER: Hello. I'm going to do a presentation today briefly on New Source Review offsets in California. The cost and availability of offsets is an important consideration in siting new power plants and expanding existing power

plants.

New Source Review, called NSR, is a preconstruction permitting program for new facilities and existing facilities that wish to expand. Permits are issued locally by the 35 air pollution control and air quality management districts in California.

As many of you are aware, most of the highly populated areas in California are non-attainment for one or more of the state or federal air quality standards. New Source Review applies to these non-attainment area.

New Source Review is a program that has two main components. First of all, it requires the application of the best-available control technology, and secondly it requires offsetting of any remaining emissions. We're going to be concentrating on the offset requirements of New Source Review in this presentation.

In general, the concept behind offsets is that new and expanding stationary sources of air pollution mitigate or offset new admissions that remain after the application of best-available control technology by reducing emissions from other sources of air pollution.

Offsets are required at generally a greater than one-to-one ratio, so that when a new source is sited or an existing facility expands more emissions are reduced than are increased. This allows industrial development to continue in polluted areas while not undermining the progress toward clean air.

Offsets are required by both the federal Clean Air Act for major new stationary sources and modifications in non-attainment areas. Major stationary sources are defined by their potential to emit criteria pollutants and, depending on the non-attainment area that they're located in, the thresholds vary.

So, for example in a cleaner area, moderate non-attainment, the threshold for a major source would be 100 tons per year. In an extremely poor air quality area, such as Los Angeles, the major source would be ten tons per year.

The California Clean Air Act, which is in the Health and Safety Code, does not explicitly require offsets, but it has a term called no net increase in emissions. And generally, the local air districts meet that requirement by requiring

offsets.

The California requirements are actually more stringent than the federal requirements in that more sources are subject to the no net increase, and the state air quality standards are more restrictive than the federal.

Each of the 35 air districts in California have local rules that consolidate the state and federal requirements and are tailored to meet the local needs. That's basically what I'm going to talk about on New Source Review.

And now what I'd like to do is talk a little bit about some information that we've collected on the costs of offset statistics. So for the past ten years the Air Resources Board has compiled and published data on the California air districts costs of offset transactions statewide.

These are third-party transactions, where a buyer and seller exchange -- basically, money is exchanged for the purpose of an offset. These statistics don't include internal reductions that are done at a facility in order to accommodate modifications. So these are transactions between a buyer and a seller.

In our statistics the parties are not

revealed. So we basically report tons traded and dollar costs. The most recent report is for the year 2002, and that and all the past reports are available on the website that's listed up there.

One other thing that I need to tell you about the statistics. I'm going to give you California overall, but the reality is that an offset market is local to the local air district. So there's 35 air districts, and an offset purchased in a particular area is dependent on the availability for that area.

So if you look at this slide, it shows that the average statewide NOx prices from 1993 to 2002. And you can see the average cost per ton has steadily increased over the past several years. In 2002 the average statewide cost per ton of NOx offset was $35,000 per ton. It varied from a high price of $140,000 a ton to a low price of $990.

So, again, that talks about the varying markets in these different air districts. For PM-10 this slide shows that the statewide average PM-10 price from 1993 to 2002. Note that there's a sharp increase in the average PM-10 price in 2001. The price increased relatively small in 2002.

The average price 2002 cost was $49,000

per ton. Again, there's a large variability depending on the markets. In 2002 the highest price paid for PM-10 offsets was $137,000 per ton, the lowest was $3,300.

And now look at the VOC -- volatile organic compounds. Again, this shows the same years. You can see that VOC prices have fluctuated over the years, with the past years data showing a decline in the average price comparing to 2001.

The average price in 2002 was $9,600 per ton. And the variability was that the highest price was $70,000 a ton down to a low of $490. Now this charge shows the number of tons traded -- again from 1993 to 2002. The trend line started climbing in 1999 and then jumped in 2000 and 2001, especially for NOx and VOC offsets, which in 2000 had an excess of 3,000 tons bought and sold.

And as you can see, the number of tons dropped dramatically in 2002. Note that even though the demand for offsets is less last year, the average NOx and PM offsets increased in 2002.

The boom in power plant construction in California corresponds with the increased activity of the offset market over the past few years.

This charge shows the megawatts of power capacity approved by the Energy Commission from 1996 to 2002.

You can see a large increase in power plant projects in 1999. You can also see, by the 2002 data, that the building boom has slowed. This is also reflected in the decline of the offsets that were traded last year.

To give you some perspective of how many offsets an individual power plant would have to purchase, a typical 500 megawatt plant with best-available control technology installed would need roughly 180 tons of NOx offsets, about 80 tons of VOC offsets, and about 120 tons of PM-10.

Now that number actually can vary, and it's because the non-attainment status -- you remember I said there's different thresholds for major sources -- so depending on how severe the air quality is that lower threshold would mean purchasing more credits.

Federally mandated offset ratios again are more than one-to-one offsets for the new increases in emissions. And sometimes plants have chosen to do inner pollutant offsets, where they supply one type of pollutant in exchange for

others, so those have offset ratios associated with them.

The types of tons that we've seen traded -- the bulk of the 2002 offset trades came from reductions from stationary sources, about 2 percent came from agricultural sources, such as containments in agricultural burning. And less than one percent came from mobile source emission reductions.

We noted a similar pattern in 2001. Another way to examine the types of reductions used to create offsets is to look at emission reduction credits applications that we see, that come through the ARB from the districts.

From 1997 to 1999 80 percent of the offsets were from equipment shutdowns or facility shutdowns. More recently we've seen greater activity from reductions in agricultural burning. Road paving appears to be an increasing means of PM-10 offsets.

These statistics also show that a generation of offsets has not been a great incentive towards technology advancement. The original idea was that there would be a market and entrepreneurs would go out and look for methods

for reducing emissions and advanced technology to create offsets.

But in reality, what we see is shutdowns, curtailments, and a few other items thrown in for offsets. One benefit we do see, though, from the offset threshold, is that many facilities will do everything possible, basically advance the technology to avoid having to provide offsets.

This chart shows the current status of the cross-section of the district VOC and NOx banks in the state. These balances typically don't change that much from year to year.

As you can see, the San Joaquin Valley, South Coast, and Bay Area have the largest balances of VOC's in their banks. The San Joaquin Valley and the Bay Area have the largest NOx balances.

It's important to note that not all banked offsets are actually really available for sale. Many companies keep their banked offsets in their accounts, and it looks like they're available to be trading, but a lot of them save those for their own increases.

Obtaining offsets for large power plant

projects may present challenges. While the demand is less than it was in the last few years the supply varies throughout the state in different markets.

We've seen some different opportunities, we're involved in one -- a power plant project in San Diego where they were able to put together a package of mobile source emission reductions, reducing emissions from marine vessels, and trash trucks and other mobile sources.

There's also some companies that have invested in generating credits from old diesel agricultural pumps, IC engines. And also the South Coast Air District has recently passed a credit rule that would allow a combination of short-term credits, credits that would only last for a few years, to be combined into a long-term credit package for siting things like a power plant that have a long life.

We still hear periodically from parties about major concerns about offsets. We don't have specific evidence of projects that have pulled out of the market because they couldn't find offsets, but we do often hear concerns about the availability.

And finally, future changes to New Source Review. As you may be aware, December 31st, 2002, the Bush Administration promulgated new federal regulations for New Source Review.

California and many other states have sued USEPA over what we consider to be a severe weakening of the New Source Review requirements. So the future of New Source Review will be affected by the outcome of this legislation.

In addition, in an attempt to preserve the old federal program, there is currently a bill, SB 288 introduced by Senator Sher, which would reinstall or actually install into the California state law the federal regulations as they existed on December 30th of 2002.

The problem with this is that state law is already more stringent than the federal requirements as I mentioned earlier, so it may complicate New Source Review -- even more complicated than it already is.

And also, in the Clear Skies Initiative, which is an initiative that's been floating around at the federal level for about a year or so -- and it's had highs and lows -- but it has a component for power plant siting that may remove the New

Source Review requirements and instead install a cap and trade type of program for power plants.

So, again, that legislation has gained momentum and then dropped back, so it's anybody's guess as to what's going to happen with that. So that concludes my presentation.

MS. ALLEN: Thank you, Bev. Chris, I was going to ask Matt for a brief explanation of something. Matt, could you discuss briefly how you deal with assessing the efficacy of offsets in the power plant siting process we have here?

MR. LAYTON: Again, I work in the Power Plant Siting area at the Energy Commission. We work with the air districts, the power plant developers, the USEPA, and the Air Resources Board on these applications.

When a power plant comes in the primary mechanism for offsets is the district rules, which are the delegated NSR requirements, the New Source Review requirements from the feds. That will create the initial determination of whether offsets are needed or not.

But on top of that we also look at, from CEQA perspective, if additional mitigation is needed. Some of the offset thresholds for

particulate matter, PM-10, are higher -- are above what the power plant might emit.

And therefore the power plant might not have to supply any particular matter offsets for that particular process. We, from a CEQA perspective, would require those offsets or mitigation. And I guess that's an important distinction.

When we're talking about compliance with the district rules we're talking about offsets, we're talking about CEQA mitigation. We're looking for mitigation that reduces the impacts, so the Energy Commission has more latitude on what constitutes an adequate mitigation versus what might be an adequate offset.

The district does determine whether or not the offset meets all their requirements. They have to do surplus enforceable, permanent, quantifiable, and one other component.

Again, when looking at mitigation we have a little more latitude. So the offsets have been an issue in power plant siting. Ultimately we've found that the developer can find enough offsets.

We don't necessarily think it's an

inexpensive proposition for them, but we think the offset programs do provide benefits, and that these new power plants actually probably result in a net decrease in emissions for most of the pollutants.

MS. ALLEN: Thank you. Chris Gallenstein, from the Air Resources Board. He'll be talking about the Air Resources Board guidance documents for new and existing power plants that have been mentioned several times in earlier presentations.

MR. GALLENSTEIN: Good morning. I want to start and talk a little bit today about what ARB has actually done as far as guidance documents, especially around power plants and electric generation facilities.

To give you a little bit of background, prior to 1996 and deregulation, there were relatively few power plants built. There was a time when a lot of biomass plants came on. The major facilities had been built and were there for years. There were some co-gens coming.

But overall there was not a large spike in power plants being built up until that date. After deregulation the opportunity to build power

plants came on, and by 1998 the CEC had identified 35 new power plant projects, totally over more than 22,000 megawatts, and actually had ten projects in hand that they were actually starting to review.

Looking at this, and looking at the size of the projects, they were typically 250 megawatts al the way up to 1,000 megawatt plant and sometimes more. We saw this potential for significant air impacts associated with the large number of facilities going in, and the large quantity of emissions that they produced.

So we set out some goals before we actually came up with our guidance document. In California we wanted to ensure that only the cleanest facilities would be sited. We wanted to promote statewide uniformity.

We know that in certain areas of the state -- as Bev was pointing out -- in New Source Review they have different requirements. But really, to us, BACT when it is triggered is something that should be uniform across the state.

We wanted also to provide formation on the type of control technologies that were out there and available. And we wanted mainly to

assist the district personnel and potential applicants in establishing what we considered to be best-available control technology.

We also wanted to give these applicants and air districts kind of a better understanding of California's regulatory requirements. So your first guidance document actually came out July 22nd, 1989.

Because what we were seeing coming online were large, natural gas-fired turbines, our guidance centered around these turbines at greater than 50 megawatts. Our guidance laid out what we considered to be best-available control technology for various pollutants.

For example, for NOx, for combined cycle, we were looking at two and a half PPM over a one hour average, or two PPM over a three hour average. In this guidance document we also addressed how offsets should be made available, when they should be coming online, or when they should be surrendered, etc.

We talked and gave them information on ambient air quality analysis, health risk assessments, and other permitting considerations. This document is online at the website that's

listed.

The next guidance document was actually mandated under SB 1298, the DG regulation to come out with a permitting guidance document on distributive generation. This guidance document was centered around gas-fired turbines and reciprocating engines that were rated at less than 50 megawatts.

This document also listed what we would consider to be BACT. It was an output standard instead of performance standard. And so it was a pound per megawatt basis. We are also required to list what we could do to help permits go through the process faster.

In other words, have some information on permit streamlining. And we also had to look at the benefits of co-gen units, of combined heat and power units. This document is also online at the website listed.

Currently we are looking at a guidance document to reduce oxides and nitrogen from existing electrical generation turbines. What we're currently doing is an evaluation of all the control technologies that are out there.

Everything from water-injection, SCR,

enhanced steam injection, all the different ways that can be utilized to reduce NOx. Along with that we've been gathering data on the costs for doing this.

It's quite interesting once you start looking at the costs for retrofitting versus the cost for something going in new. When there is no school piece in the Hersig (sp) and you start having to tack on additional pieces of the puzzle to get the thing to work.

We anticipate that we will be coming out in the fall with this guidance document. At this website there is also a list serve. This is an actual document that we are currently developing. There is a list serve at this website so that you can sign up and respond with information to us if you have information on new technologies.

You can also -- anything that we will do as far as our workshop or work group meetings -- of which we've already held one -- will be notified through this list serve. So I would recommend anybody that's interested in what we're currently working on.

And I know that the CEC as well as the ISO as well as a lot of owners and operators of

electrical generation are curious of what we're doing. And so I would request all of you to kind of look at what we're doing, give us some feedback, show up for the work groups, etc.

And then as far as the future. The BACT items that we put out in 1999, we are looking at updating that guidance document. We are looking at the new, lower levels that have been achieved. We know that BACT has dropped, particularly for simple cycle turbines as well as for combined cycle turbines.

And then also, under the DG regulations we're going back and we're required by our Board to look at the benefits of the combined heat and power and how those are calculated in. And we're going to have to do that by 2005. Thank you.

MS. ALLEN: Thank you. That concludes the presentations for Part Two. So it's time for questions or comments? Commissioner Boyd, did you have anything you wanted to ask or add?

CHAIRMAN BOYD: No, I think I'd prefer to hear from the audience, and then I might come up with a thought or two afterwards.

MS. ALLEN: Okay.

MR. SADREDIM: Hi. Sayed Sadredim with

San Joaquin Valley APCD again. I just had a couple of questions regarding distributor generation, one for ARB and one for CEC. At California Air Pollution Control Officers Association and individual districts we've been approached by a number of environmental organizations that believe that there is a huge surge in distributive generation right around the corner.

That we will have a lot of these sources, smaller power plants, going in population centers, neoreceptors. And that ARB guidance and the district regulations through New Source Review are not sufficient to deal with those potential sources, and they think we should adopt technology forcing new regulations.

I just wanted to know what ARB's view was on that. Whether there is a gap in the guidance or in the regulations that are in place right now for distributor generation that could be filled by some other means.

Also, from the CEC, what is their latest projection in terms of distributor generation. I know they had made an initial projection a couple of years ago regarding distributor generation

which, to this point, we haven't seen that rush coming through.

So if it could be answered today or perhaps in the report, we'd like that issue to be covered, whether distributor generation is sufficiently covered by existing regulations.

MS. ALLEN: Chris or Mike, do you want to address that from the Air Resources Board perspective?

MR. SCHEIBLE: Well, currently the standards that are in effect are for non-permitted distributive generation, which falls under our program and our guidance. And I would say that districts for permitted generation should apply the same standard.

There's more NOx per megawatt hour by a fair amount from the very small sources than from building a new combined cycle power plant. So there is a gap. We believe we set the standard at what the best of the current technologies can achieve.

And then we have in 2007 the second step, that is, is technology forcing. So I don't know that the districts can do a whole lot more to push that. I think it's still wait and see over

will there be a big surge in the DG area.

And it all comes down to economics. What's the cost of central power, and what's the certainty of staying on the grid, versus going off the grid either to save money or to make certain that if there is a future problem with power supply then at least your industrial park is well-positioned to provide its customers with the power they want.

MS. ALLEN: Thank you. Other questions or comments?

CHAIRMAN BOYD: Let me add, just to help Mike out here -- not that you need any help. But the point that he made about the future is uncertain I think is the thing I would underscore. The future of our electricity supply situation in the state is in a state of flux, to say the least.

The exit fees issues, the other issues associated with what I like to call paying off the mortgage that we took out, in some cases have had a chilling effect on making progress in some areas. There have been some breakthroughs in the sense of providing opportunities for DG.

But I would agree that the future is extremely uncertain. And I'm actually anxious for

tomorrow's workshop to see what the staff is thinking, because the last preliminary workshop on this subject, DG was one of those rough edges that didn't get addressed to well because of the uncertainly.

So, kind of watch that space called DG, and we'll see where the future takes us. The transmission -- DG can be lots of different things. It can be an ability to provide energy security. It can be a way of addressing distribution and/or transmission shortcomings.

But that's all in future think a little bit, we're not there yet. So, it's going to be a tough one.

MR. ABELSON: Thank you. My name is David Abelson. I'm not sure who among the speakers to address this to, although I'm thinking perhaps the last speaker might be the most appropriate.

It sounds as if, with regard to BACT and NSR and available emissions credits that the general view would be that air quality concerns are probably not going to be a barrier per se to new generation in the state in the immediate future.

My question is the impact of the rules on existing facilities. I'm remembering -- and frankly I'm out of touch with how things have evolved -- that back in the late 80's and early 90's there was a mandatory best-available retrofit control technology set of rules for gas turbines and steam boilers that were under consideration at the time.

And these would have been basically applicable to all facilities, but particular size or greater. And in the end, again as my memory recalls it, a decision was made to go to some kind of a bubbling approach instead, as a way of allowing a certain amount of flexibility and market trading, I guess, as an approach to this.

Is there someone who could tell us in a very simple way, are we back to command and control on existing facilities, are we still in a trading situation with a bubble and a cap.

And regardless of where we are, is it likely to have any kind of forcing effect on existing generation. That is to say, imposing on them some pretty major expenses that in turn might be decisive in terms of whether they chose to continue to operate or to shut down?

MR. SCHEIBLE: You're right. The bubble and cap rules were designed when you had three utilities and then a couple of large public utilities that controlled the units. And basically their job was to provide the power that met the demand.

And the bubble rule kind of made sense because they controlled all the assets, and they controlled the dispatch of the assets, so you could have a pound per megawatt hour limit applied hourly or 24-hourly or whatever. And they had the control aspects to implement that.

I think the aspects of the bubble have continued to be applied after deregulation, but then it's applied more to a common entity, say in the Bay Area that owns a bunch of plants. And then can average across those plants their NOx emissions and step down NOx emissions over time.

But in the deregulated market the owner of those plants is going to say how much does it cost me to retrofit with NOx control and meet that rule versus retire a given unit.

And in some cases they're sitting there judging if it's an old plant that doesn't have that much of an economic future and may well

retire it.

When we get to the issue with peakers, that's going to be a concern. As the peakers have high emission rates when they operate, they don't operate many hours. Unfortunately, when it's really hot two things happen. One, the plants can get, you know, the power is needed. And two, the hot weather tends to also go along with ozone formation.

So we have high pollution days in the same hours of the year that these plants are most likely to operate. So we have to tackle that. A lot of things have shifted. We're not back to every plant has to meet a straight emission limit in terms of the retrofit rules.

But it's a much, it's closer to that than it is to the general basin-wide bubble rules that we had before.

MR. ABELSON: The corollary to that change of circumstances is that do people at your agency know or people at our agency know what the fact that the regulatory regime has sort of shifted back towards a more project-specific focus what if any implications there are for the number of megawatts that are likely to be retired as a

result of that on an economic basis.

Are folks tracking that, do we know?

MR. SCHEIBLE: Well, we've had indications from at least some plant owners that their decision is to retire the plant rather than expend the money for the retrofit. so that gets thrown into the planning effort.

CHAIRMAN BOYD: We've been put on notice, probably both of our agencies, by letter several months ago, that several thousand megawatts in the Bay Area will be retired rather than make the economic investment in retrofit.

And if you look on our website at our electrical demand forecast, or tomorrow's workshop, I think it carries a line of about 5,000 megawatts we're anticipating going off, being retired.

MR. SCHEIBLE: Now done correctly that's actually a pretty good deal. If we get adequate replacement power from new units, you have lower emissions, you have higher energy efficiencies, you've probably got some other mitigations because the retrofit plans are pretty clean but they're not nearly as clean as a new provided cycle, and there not nearly as efficient.

So the issue comes down to, as we see older units being retired, then we need to make sure that additional new capacity or energy conservation measures, or something else, steps in there. And if we do that we have enough benefit.

Plus, I think we've found out that relying on all those older units for a significant percentage of your needed capacity is not the most secure thing to do either.

MR. CARMICHAEL: Tim Carmichael again. Just a couple of questions and comments on the California generation air emissions. I think it's an error or mistake for CEC to focus so much on NOx emissions, at least that's how it seems the agency's going based on this presentation.

From our perspective, NOx is no more important than PM or VOC's or ROG when it comes to public health or climate. And I think CEC should give equal weight in presentation and analysis.

The key point is, on the last page of that presentation there's a table for various sources just for NOx emissions. And I think it would be valuable for those that are tracking this issue to have that same table for PM and for ROG. So I would encourage that change to be made.

The other, another point that relates to that presentation and the one directly before it, on the energy and air pollution trends from the ARB presenter, there is a bit of disconnect in where the agency's suggest we're going to be in 2010. At least that's how I see the slide.

CEC's saying NOx emissions are going down, where ARB is saying that the combined ROG and NOx are actually going to start to increase in what looks like 2008 or around that.

And I guess it's possible that ROG emissions would be going up, and that would account for the difference. But I think it would be good to know why they are going up, if that's the reason for the difference between ARB and CEC's information.

So in the form of a question, is that what's going on. Are ROG emissions going up, and if they are, why? Projected to go up I should say.

MR. HUNSAKER: Well, that slide that you're referring to is I think the last one I showed where you see the tail end and it kind of tips up. That's basically showing that controls have pretty much gone into effect in that

particular forecast run that we did.

Pretty much, there's no more controls after 2005 or whatever the cutoff is. And then you just see growth. That's causing this thing to kind of come up slightly. And basically with the tail -- that's why you see that result.

It's a combination of ROG and NOx. It's not just the ROG going up and the NOx necessarily remaining constant.

MR. SCHEIBLE: Well, what happens in the projection -- I'm assuming this is what happens. All the existing retrofit rules should take full effect by 2005, and so after that point you get really no projected reduction from existing sources other than retirement.

And we don't do a very good job of figuring out exactly what gets retired and what it gets replaced with. I think it would take a more sophisticated analysis of that.

So I would just treat that as, basically, a flat line reflecting that the existing older units have all been retrofitted, and then we get growth. Now if we get growth from new units that are well-controlled, and not ending up in retired older units, you'll actually see

that downward trend to continue.

And I would hope that would be the case.

MR. HUNSAKER: Yes. That trend is more of a worst case. When we do our projections we tend to focus on more of a worst-case scenario. We don't try to -- we don't want to show a trend that's necessarily going to give you a false impression of the future.

So we try to show you an idea of where we think things are going. But as Mike Scheible was saying, we're not really showing reductions of the retired units, we're not showing the reductions that come about when you replace retirement megawatts generation with new, clean units.

And also fluctuations in the actual grid itself from imports and hydro, which can fluctuate from time to time. You really can't predict that very well. So I guess you can take the trend for what it is, and just kind of realize that there's a lot of uncertainty when you get out to those years.

MR. CARMICHAEL: Thank you. One more point. I want to come back to the power plants out of state for just a minute. And emphasize how

important an issue this is for the environmental community in California.

You know, our perspective is that, relative to air pollution, there is no such thing as a way.

And our society has gotten into trouble many times over the last 50 to 75 years in thinking that we were going to address a given environmental problem by putting it n another part of the country or even in another community based on economics or other factors.

And somehow ignore that there's an impact there. And though it may be true that there is less human health impact with some plants sited in remote areas, there is no less impact on the climate, there is no less impact on visibility, there is no less impact on the plant life -- forests in many cases.

And I think it's -- you know, the fact that CEC is not reporting this data right now suggests that the problem may be worse than we believe it is. And to the extent that CEC doesn't think it's a significant problem, I encourage them to start reporting it, and then we know what we're talking about as far as scope of problem or scale

of problem.

But it is inaccurate to present a picture of California's air pollution associated with power generation and not show the air pollution that's coming from generation sources outside of the state. Thank you.

MR. LAYTON: I've been reminded by Mr. McKinney that the Environmental Performance Report 2003 version will make an attempt to look at the out-of-state emissions.

Again, the data is difficult to come by, and then the meaning of the data is -- we have much better control and understanding of what goes on in this state and even I think the discussions here suggest it's not a perfect understanding of air quality and air emissions.

Out-of-state it becomes a very complicated issue. But we are attempting to look at it in this 2003 Environmental Performance Report, which is one of the components of the Integrated Energy Policy Report.

MS. ALLEN: Jim McKinney of the Energy Commission staff has something to add. Jim is the manager of the Commission's Environmental Performance Report effort.

MR. MCKINNEY: Thanks, Eileen. I appreciate Mr. Carmichaels' comments. And I do want to emphasize that it's really under the auspices of the Environmental Performance Report that this is the first time that we've attempted to look categorically at out-of-state emissions.

As Mr. Layton mentioned, '03 will be the first time we've done it. So we are looking for recommendations on sources and methods for how to portray emissions and emissions factors from out-of-state generation.

If I could plug EPR for one additional minute. We are going to release our draft at the '03 Environmental Performance Report later this month, and on July 8 we will have a workshop similar to this, but we will be looking for input and participation from our sister agencies and the public and the stakeholders involved with that.

So please note that on your calendar so you can help us do a better job on our reporting.

MS. ALLEN: Jim, can you talk briefly about the array of areas the EPR will cover. Air quality is one. The others?

MR. MCKINNEY: Yes. The Environmental Performance Report. We look at three

environmental media -- air, water, and land and biological resources. We also look at a number of social and community resources, including land use, environmental justice, and socioeconomics.

Again, this is our second report. We're doing a fair job, we can make progress as we gain experience. So, again, contributions from sister agencies and stakeholders to help make that better will be appreciated.

MS. ALLEN: Thank you.

MR. ALVARADO: Eileen, I'd like to add one more modification to Mr. McKinney's characterization, because the Energy Commission has looked at the out-of-state power market, and has tried to identify emissions going back the last decade.

When we've even tried to assign residual emission values for the energy that we've imported. The difficulty that we've had today, as Matt has identified, is access to adequate information to be able to actually measure what imports we have and tag those electrons.

So any additional information. That is something we're really trying to tackle. In addition to that, every year we do put out, in

that system power report, where we at least attempt to identify the split of the resources that come into the state.

And, again, that is the best professional estimate we can come up with, given the lack of information we do have.

MR. BOYD: I'm glad that both Jim and Al added to the dialogue, because although I've only been here 15 months, I know the Commission has this kind of data, and I didn't want Tim to go away thinking we don't care.

I think Al's point about it's hard to tag the electrons in this free market it's tough to tell real well. We do work with the ISO and the western grid to ascertain where our energy comes from, and therefore what are emissions attributes of the energy.

We have published data as best we can, and we've talked about it a lot internally as to what are the environmental consequences of imported power. We talk about coal by wire inside here quite a bit. And I think, probably Mike Scheible and ARB are in a position to help you, Tim.

And if I can remember my six years with

the Grand Canyon Commission, and all the data developed on the inventories for that effort and the subsequent efforts with regard to vistas and visibility and what-have-you, I would think there's a fairly decent body of knowledge out there to at least build upon to provide some of those answers.

And I know Mike was in the small conference room in the governor's office many a time when I was there as we worried about the energy crisis. There was never a point in time when we didn't worry about the emissions consequences of some of the decisions.

Now sometimes coal by wire beats the heck out of firing up a diesel generator somewhere inside California, so there are tradeoffs.

We've gone somewhat past that, but until our future is better known, and until the consequences of this failed experiment, and the Enron debacle and the Arthur Andersen debacle and the shrinking of the financing, of the financial institutions in the total energy area, but particularly in electricity, it's really hard to make projections deep into the future as to what the total mix of our generating sources will be,

and thus what the emissions characteristics will be. But it's not that we don't care, and we'll keep doing that.

With regard to the letter from Imperial County over the international boundary issue, and generation on the other side of international boundaries, at least to the south of us, specifically Mexico, there has been a Board of Governors conference regarding the ten boarding states of both Mexico and the U.S. that's about ten years old I believe.

Energy has always been a subset of environment. This year they created energy as a separate work subject to be dealt with and integrated closely with the environmental issue, but to give it more focus. And so that group will be addressing some of those issues.

Yours truly is the co-Chair with one of my peers from a Mexican state of that effort. And I recognize that when people build power plants south of the border sometimes they're doing it on speculation.

And sometimes they're doing it in accordance with a specific request for bid made by the government which then sets the specifications

for the environmental goals to be achieved. And so some of our issues will be with American-based proponents of projects.

And some of it, unfortunately, is with the government of Mexico and the criteria they establish in the documents they've put forward for people to bid on. So to get some of those people at those plants to spend more money and come up to California standards has been quite a struggle because they're locked into a contract.

To get those who built on spec, that's a little different story. And those debates still go on. But that's the kind of issue we're into these days, and those are the kinds of issues that we'll continue to pursue.

There's no question that there will be more activity across the southern border with regard to energy in the future.

MS. ALLEN: I would just add one minor item to the concept of the electrons coming in by wire from other states, which is that, if there were to be a need for more transmissions capacity, that it's not easy to add in new, large lines to bring in large amounts of power.

It can be done, but it tends to be

complex and time-consuming. So, that's another complication related to out-of-state power coming into California. That concludes Part Two.

We're running about half an hour behind schedule. If at all possible I'd like to resume at 1:45. I hope as many of you can return in the afternoon as possible. For this morning's speakers thank you so much for preparing thorough, insightful presentations.

You all did an outstanding job, so thank you for the effort.

(Off the record.)

MS. ALLEN: We're going to resume the IEPR Air Quality Public Health and Energy Workshop. For those of you who have just come in for the first time today, there are agendas out on the front table. We're going to resume a series of powerpoint presentations.

The next presentation is by Steve Brisby of the Air Resources Board, and he will be making a presentation on clean fuels and air quality impacts. Steve, I notice that your presentation had over 30 slides, so if you can make it as brief as possible that would help our other speakers.

MR. BRISBY: Good Afternoon. My name is

Steve Brisby. I'm manager of the Fuel Section at the California Air Resources Board. My group is primarily responsible for the transportation fuel regulations as they relate to emissions reductions and air quality benefits.

I'm here today to speak briefly, to give you an overview of the California Motor Vehicle Fuels Program. Very briefly, it will be in several sections.

Quickly, a background regarding work that we've done in the past and I'll discuss diesel fuel, present some information on gasoline, alternative fuels, and then close quickly with a summary.

I'm sure you've seen bits and pieces of this, so I'll go quickly. Basically, California has an air quality problem. 24 million vehicles, a million and a quarter diesel fuel vehicles, over 90 percent of Californians breathe unhealthy air at one time or another during the year.

California Clean Air Act requirements for mobile sources. Basically, achieve maximum feasible reductions in particulate matter, carbon monoxide, and toxic contaminants.

Achieve maximum emission reductions of

volatile organic compounds and oxides of nitrogen by the earliest practical dates.

Adopt the most effective combination of control measures on all classes of motor vehicles and their fuels.

Our strategy could be put together in a few words, while it is very complicated. We try to treat the vehicle and its fuel as a system. Try to coordinate the fuel changes with the technology changes in the vehicles to generate an optimal emissions reductions and control strategy while trying to be performance based to allow some flexibility.

Some folks will say not enough flexibility, we try to do the best we can. So that you have -- basically to treat the vehicle and the fuel as a system.

California has a long history of controlling motor vehicle emissions and controlling fuel.

Here's a fairly comprehensive list without any details of California's vehicle fuel programs as they have gone over the years.

The most significant first one was in 1971 with Reid vapor pressure control and

controlling bromide number, right up until basically Friday when we proposed -- or actually we released for public comment prior to the July 24th hearing -- our 15 parts per million in sulfur and diesel rule.

The summary of the fuels program. Basically you see a table that has some emissions reductions estimates based on a 1995 inventory. These numbers do change as our inventory changes, but this is the best way to compare the relative emission reductions for each program.

What we see is hydrocarbon reduction totalling about 400 tons over the years, NOx at 190, 20 tons of particulate matter, 1,300 tons of carbon monoxide. Now I'll briefly discuss diesel.

Our diesel fuel program was adopted in 1988, implemented in 1993. It provides flexibility by allowing the certification of alternative formulations of diesel fuel.

This is a comparison between the California program and the federal program that went in. Theirs was implemented in 1993 also. Both rules set a cap of 500 parts per million for sulfur. Our rule included a ten percent aromatics limit to the flexibility point, and provisions to

allow you to certify an alternative formulation if you can demonstrate that your formulation is as clean as a base formulation with ten percent ethanol.

Small refiners, due to their economics, was given a 20 percent standard, but they also produced to limited production. Our rule is to all motor vehicles, both on and offroad motor vehicles, while the USEPA is only onroad motor vehicles.

Here's a brief summary of emissions reductions. What we see is significant SO2 reductions, PM reductions, and a very large NOx reduction. Their regulation was not targeted towards reducing emissions of oxides of nitrogen, that have played a major component of our decision to adopt the rule that we adopted.

Brief comparison of our fuel before, our fuel after, and the USEPA rule. We can see the sulfur levels in California are much lower, aromatics are much lower, the cetane number is significantly higher in both prior to the 1993 and what you would expect, and find, nationwide outside of California right now.

Other diesel fuel activities. This is

to provide a context for some of these diesel rulemakings. In 1998 the Board listed diesel particulate matter as a toxic contaminant.

In October of 2000 the Board approved a diesel risk reduction plan to reduce exposure to diesel particulate matter.

The diesel risk reduction plan. Diesel PM represents about 70 percent of the statewide cancer risk from toxic air contaminants. I guess the bottom line is the goal is an 85 percent reduction in diesel particulate matter by 2020.

One of the major parts of this is to implement a 15 parts per million sulfur program in diesel fuel for California.

Other programs, to compare our program with their program. South Coast Air Quality Management District has already adopted a 15 parts per million sulfur and diesel fuel rule.

Their rule for stationary engines goes into effect in 2002 -- their rule goes into effect for motor vehicles in 2005, unless the Air Resources Board adopts for 2006, then they will slide their implementation date back to be in the same time as our implementation date.

Their proposal will be for June of 2006.

This is concurrent with the USEPA proposal, which takes me to the next item. USEPA has already adopted non-road rule, 15 parts per million for sulfur and diesel fuel.

Their rule is more complex than ours, because it has trading mechanisms, crediting mechanisms. Ours will be a fairly blanket switch-over of the transportation fuel both onroad and offroad to 15 parts per million.

Currently the EPA is requesting comments on their offroad rule. The current proposal -- I believe -- based on the Notice of Proposed Rulemaking, would be to go to 500 parts per million for their offroad in 2007, and then 15 parts per million in 2010. Where ours will be concurrent with our onroad in 2006, as proposed right at the moment.

Basically, I just went through that. We propose to put a 15 parts per million limit, again. Propose implement in 2006. It's necessary to implement the diesel risk reduction plan. It is part of our diesel risk reduction plan that was approved by the Board.

And we'll be modifying the fuel specifications as appropriate to maintain

consistency within the various diesel fuel programs.

Quickly, gasoline programs. California phase two gasoline -- adopted in '91, implemented in 1996, puts limits on those properties. These are very similar to the properties USEPA specifies under their phase two reform of gasoline rules also.

Here's a brief, basically, typical properties of California phase two gasoline. What we'll see if this stands out is the aromatics limit is around 23 percent by volume, and the sulfur is about 22 parts per million, where outside of the state it's running about 330 parts per million.

Benefits. This was a very significant program. The initial reductions were equivalent to roughly removing three and a half million vehicles from California's roads. Reduce smog-forming emissions from motor vehicles by 15 percent. Reduce benzene emissions by half. Reduce potential cancer risks from vehicles by 40 percent.

And this is an important one, this last one -- it was a quarter of the SIP reductions that

had to be credited in 1996. Had that rule not gone in the way it went, all of those initial reductions would have had to have been made up through other programs.

Phase three. Basically, as approved on December 9th, 1999. Implements the governor's executive order to phase out MTBE and provide additional flexibility to remove oxygenates from California gasoline.

This comparison of the properties is a little bit detailed, but it comes down to we've lowered sulfur a little bit, and benzene a little bit for gasoline. This was to provide some flexibility to the refiners for removing MTBE and allowing the use of ethanol.

MTBE, as compared to ethanol, is a much simpler blend stock to blend in gasoline strictly from a refinery point of view. It was going to be much harder to make ethanol gasoline, so we adopted regulations to increase the flexibility to accommodate ethanol and imports from other states.

Implementation issues. As of right now, about 70 percent of California's refining capacity has already switched over, away from MTBE, and is starting to use ethanol. The rest of the

refineries must switch over by the end of the year, because the phaseout date is the end of this year.

Where, starting January 1, MTBE is prohibited from being used to create reformulated gasoline in California. There's a couple of terminals yet to modify, which is why you don't see it everywhere throughout the state. But we expect everybody to be fully in compliance by January, 2004.

Very quickly, I'd like to present some information on alternative fuels. As demand for conventional fuels increase, and emission standards continue to become more stringent, the opportunity for alternative fuels and advanced technology vehicles will continue to increase.

To ensure that low-emission vehicles designed to operate on alternative fuels will have commercially available fuels, we have regulations that specify the parameters for these alternative fuels.

It also recognizes the current certification of low-emission, alternative fuel vehicles. At the moment we have specifications for fuel methanol, fuel ethanol -- both pure

ethanol and 85 percent ethanol, 15 percent gasoline. Compressed natural gas, liquefied petroleum gas, and hydrogen.

For compressed natural gas there are some outstanding issues at the moment that relates to the supply and quality of fuel. The transportation fuel requirements are a little bit more stringent than the other requirements, and there's some concern over how the energy content of some of the natural gas out there that is not being allowed to go to the transportation fuel market.

There's a little bit too much of the heavier compounds, so it tends to burn a little bit hotter. And in non-advanced technology -- actually, in open loop vehicles it tends to get rather hot, and can generate more NOx than what is wanted.

With the closed-loop vehicles, with the feedback mechanisms, that's not happening. So basically we're looking at flexibility to allow more fuel into the transportation fuel market without running the risk of having what we call hot gas -- fuel that generates too much heat -- being used in those engines.

In summary, cleaner burning fuels are a critical part of California's air quality programs. The Air Resources Board treats vehicles and fuels as a system, and we do what we can to try to coordinate the changes and the synergies between fuel and technology changes.

Fuel regulations provide an immediate benefit from the onroad fleet. Vehicle regulations take awhile to phase in as the fleet turns over. While conventional fuels will continue to dominate the marketplace, alternative clean fuels do have a role to play as both the demand for cleaner technologies and transportation fuels increase into the future.

That fast enough? That's a world record for getting that one done. I know I went fast, there must be at least a couple of questions that I can answer. Anybody have any questions?

MS. ALLEN: The way we've been handling the questions is they're packed into the end of each section. So there may be questions for you when this section is finished.

MR. BRISBY: Thank you very much.

MS. ALLEN: In fact, Steve, go ahead. We just have one more item, Energy Commission

actions to support the Air Resources Board, as far as the energy sector.

MR. BRISBY: Okay. Isn't that Gerry?

MS. ALLEN: Well, this is an opportunity for you to answer questions. The Energy Commission action is meant to be a free-flowing discussion between the Air Resources Board staff and the Energy Commission and any members of the audience and public that have ideas. So we might as well let you finish up.

MR. BRISBY: Thank you. Are there any questions?

MS. ALLEN: Are there any questions and comments from the Commissioners? Okay. Members of the audience?

CHAIRMAN BOYD: Good job, Steve.

MR. BRISBY: Thank you.

MS. ALLEN: All right. The next item on the agenda is Energy Commission actions to support ARB's mission. So the Energy Commission staff is interested in the Air Resources Board staff perspective on what we can do as an agency to be as helpful as possible, in helping you achieve the clean air goals.

So you're on the spot, Mike, but this is

an opportunity for everybody to talk here.

MR. SCHEIBLE: Well, I wasn't prepared to be on the spot. I think we have to continue our history of very close cooperation. I know in the fuels areas we've done it. And the area of global warming and looking for clean alternative energy sources.

Energy efficiency goals, we're there. I think we work pretty well together right now, so I'm at a little bit of a loss to say this is what the Commission should do. I know one area that we have a lot of problem with and that the Commission also has a problem with is just in this whole area of forecasting, and looking into the future.

And we need it for the SIP purposes. The comprehensive energy plan kind of sets the framework for what we think the energy future is going to be, but there's a lot of crystal ball in it.

And since there's such a strong correlation between the use, the creation of energy, and air pollution, that's vitally important.

MS. ALLEN: It sounds like we could do well to work together on getting the databases

consistent and in synch.

Okay, moving the spotlight to the generation sector -- Matt, do you have any ideas on things that you'd like to see us doing to support the Air Resources Board staff?

MR. LAYTON: Well, as I said in my presentation, I think that better data is always valuable. I think the rules that are in place are actually very strong, and have actually achieved a lot in the way of reductions.

I think we should continue to implement those rules. There shouldn't be any backsliding at this point in time. So I think the CEC and the ARB are on the same page on that.

But as the power plants continue to evolve, new technologies come out, obviously there are uncertainties in how the technologies will work, so there's always going to be some give and take on what technologies get used when and where.

MS. ALLEN: Okay, thank you. Gerry, do you want to add anything from the transportation sector?

MR. BEMIS: So it's my turn to be on the spot, huh?

MS. ALLEN: Yes.

MR. BEMIS: Not really. The two agencies do have a history of working together, and we should continue to do so. As I mentioned in my presentation, we worked together for the last two and a half years on our petroleum dependency work.

I would echo what you said, Mike -- I think what I heard you say -- and that is that we need to work more closely together in making sure that your projected inventories match our forecasted electricity and fuel consumption.

And I know that there have been attempts to look at inconsistencies and we need to continue doing that. Maybe a by agency task force to look into the details of some of the differences we've had in terms of global greenhouse gases, for example, would be useful. And I certainly look forward to getting more involved in that area.

MS. ALLEN: Thank you. Any additional ideas from the audience? All right. That concludes Part Two. We'll move on to greenhouse gases. We have an introduction to the greenhouse gas topic from Greg Greenwood, the Deputy Secretary for the Resources Agency.

MR. GREENWOOD: Oh, that I'd be Deputy

Secretary. Not quite. Deputy Assistant Secretary, Science Advisor to Mary Nichols.

Just to set the record straight. For the past two years I've been co-Chair, with Dr. Bill Vance of Cal-EPA, on something called the Joint Agency Climate Team.

And this consists of staff from the Resources Agency and a couple of key departments -- water resources, NCDF. Staff from Cal-EPA, with staff from the Air Board, and the Water Resources Control Board. People from BT&H and CalTrans. People from state and consumer services, particularly DGS. People from Food & Ag, people from OPR, and people from Department of Health Services.

And that illustrious staff has worked for the past two years developing a network of people interested in climate change. Getting a clear understanding of past and current actions taken by the state in that arena.

And we've been working on drafting proposed actions that would constitute the core of a state climate change strategy. And today you'll hear some presentations from ARB and from the Energy Commission as it affects the state in

general and the energy sector in particular.

You'll hear the details in the subsequent presentations, but I would like to give you an overview of a few key points relevant to the Integrated Energy Policy Report as that Report is described in the Committee Scoping Order.

First, the climate change is real. It must be said that the planet's climate has always been marked by change. I'm not sure we've always appreciated just how swift that change can be.

Particularly when one looks in the fossil record, there are really striking changes in global temperature in relatively short periods of time, on the order of decades.

It now appears that we've constructed much of our nation during a time of relatively benign climate. And therefore some of the most basic design parameters of American industrial civilization are based on a incorrect appraisal of climate variability. Right there is a problem.

But beyond variability the climate itself appears to be warming. And you'll see more details on this. But reconstructed global temperature time series shows a marked increase in global temperature over the past 150 years.

We can also see a clear trend in a rise in sea level, which is due in part to the thermal expansion of the oceans to increased melt from continental ice sheets.

And closer to home we've already detected a decline in the proportion of runoff from the Sierra Nevada that is derived from snow melt. So climate change has continued and more than likely accelerated over the past century or two.

The second main point is that climate change appears to be mediated by changes in the energy balance on the surface of the earth and in the atmosphere. And there are many potential sources of change in climate.

There are changes in solar irradiation over long periods of time, there are changes in the earth's orbit. But the rapid change over the last two centuries matches the increased output of greenhouse gases from our civilization.

Again, you'll see more details on this, but modeling efforts that have included the emission of both climate forcing agents from anthropogenic sources and from natural sources does a better job of modeling the past changes in

temperature than modeling based on either anthropogenic alone or climate alone.

Third, the combustion of fossil fuels is a and probably the major source of climate forcing agents. There are a range of climate forcing agents out there beyond CO2. There's N2O, there's methane, there are fluorocarbons, there are sulfate aerosols, and there's black carbon.

There's a lot of different things that regulate the energy balance on the surface of the earth. But the thermal effect of CO2 dominates the calculations that we're able to do at this point on overall climate forcing.

There are other activities, such as land covered change, either through clearing of land or subsequent regrowth -- in western North America for instance -- that affect the carbon cycle.

But even in the Energy Commission's own work here in California, which did attempt to quantify both emissions from anthropogenic sources and the capacity of forested ecosystems to soak up CO2, shows that really the net flux of carbon dioxide through fossil fuel combustion is an order of magnitude larger than the flux we see through ecosystems.

So that reliance on fossil fuels, especially the carbon component of those fossil fuels for energy production, is the major source for climate forcing agents.

Fourth, climate change will likely have large impacts on California. It'll have impacts on water supply for cities, for agriculture, and for the environment -- already a very contentious issue in this state.

It'll have impacts on water quality, since much of the water supply for southern California moves through the delta. There are potential large losses to coastal property and infrastructure. There is heightened risk to infrastructure from more intense storms.

There's a heightened risk to the energy infrastructure more specifically, from heat and forest fires. There are likely to be important changes in ecosystems, and there's likely to be changes in diseases. The costs of these impacts are as yet unborn by the energy that produces them, and they are potentially enormous.

They are also very large error bars around those costs, it's important to add. I'm not up here preaching apocalypse, but I am

preaching at least an awareness of potential risks and the need for applying our intelligence to this task now.

What, then, are the implications of these four points for the Integrated Energy Policy Report? Back in the 1960's, an economist from Chicago, Walter Firey, had a very interesting book called Man, Mind, and Land, in which he posited that any resource system that persists through time must do three things.

It must produce wealth, or why else would we be doing it. It must maintain the underlying natural capitol, that is, it doesn't mine the system that generates the wealth. And it must be in some way culturally congruent, which I would say in our culture has to do with markets, institutional arrangements, and fairness.

I would actually offer this framework to the staff working on the Integrated Energy Policy Report as a fairly global way of looking at the energy system.

Well, there's little doubt that energy use produces wealth, or that energy shortages can cripple our civilization. The notes leading up to the Integrated Energy Policy Report indicate a

great concern with how our institutions work to ensure the availability of energy at reasonable prices, a perspective which I find entirely appropriate, given the recent history of the state.

The notes also indicate great concern with mitigating the impacts of energy generation and transmission on ecosystems, and on the environment in general, which is similarly a laudable goal.

But it leads me to the following observation. That climate change poses a particular challenge to the IEPR, in that it is not easily mitigated within the continued use of fossil carbon.

It's not the technological form of energy generation and transmission that creates the impact, it is the very source of the energy itself which poses the problem.

Now some anthropogenic climate change is already unavoidable as a result of the last two centuries of emissions. But a complete reliance on adapting to climate change, with no emphasis on shifting away from fossil fuels, seems extremely foolhardy in light of the potential costs of

climate change.

Flipping it around, it's at least plausible -- I wouldn't say probable -- but it's at least plausible, and some scientists have suggested, that eliminating dangerous interference with the climate system will require a profound reduction in our dependence on fossil fuels in this century.

Thus, a key question to be addressed in the IEPR is how to ensure an adequate supply of energy at reasonable prices to a growing economy, while charting a course away from dependence on fossil carbon fuels.

Perhaps it is simply because I bought a sailboat within the last two years, but the following metaphor comes to mind. If you're in a small craft, and you're out in a very choppy lake, and every now and again on the crest of a wave you see a lighthouse that's perched upon a promontory that divides the safe harbor from the open ocean, in the short term you're very concerned that your tacks and jibes don't flip you over.

But you also must be concerned about the long-term trajectory that those tacks and jibes engage you in, particularly if it leads you into

the open ocean, and not into the safe harbor.

So the results of decisions made today on infrastructure, either in terms of vehicle fleets or generating capacity, will be with us for the usable life of that infrastructure, which is probably on the order, for vehicles, 15 years, and for generating infrastructure, on the order of 40.

So incorporating this concern, and enunciating clearly this question within IEPR will, in my mind, constitute major progress on this issue.

I do not expect a specific target or technology to emerge from the report, nor would I expect the report to be turned inside out and upside down to have mitigation of climate change to become the goal of the report.

Indeed, I would reiterate my contention that Walter Firey's notion of man, mind, and land comes closest to what we really need to be doing in this report over the long term.

I do hope, however, to see a recognition of the issue as something beyond a standard, mitigatable environmental impact. And to see the inclusion of a consideration of climate change within policy and program development, in line

with the principles set out in the joint Energy Commission/CPUC/CPA action plan, much as DWR has already done with respect to water supply.

They are incorporating climate change into their analysis of what needs to be done to ensure water supply in the state of California. And much as CalTrans has recently done with respect to the state transportation plan. In which they included a new policy related to energy efficiency and climate change.

Large and long-lasting infrastructure investments need to be viewed, at least in part, in the light of their long-term contribution to climate change.

While a move away from fossil fuels seems prudent, and in fact has already been engaged by the state through a number of actions undertaken -- with the renewable portfolio standard and AB 1493 -- there remain a number of very important unknowns that we need to continue to pursue.

First of all, there is a question of long-term sequestration of carbon dioxide. I find this continues to arise, that it is perhaps possible to continue to live with fossil carbon as

a main energy source, so long as we find a way to sequester the resultant carbon dioxide over a long period of time.

What I find interesting about this is that it basically raises CO2 to the level of a radioactive waste, something that needs to be dealt with. We need to ensure that we can isolate this material for very long periods of time, which is not really how we've dealt with emissions in the past.

Nonetheless, it is an issue that's worth investigating. We also need to think about the mix of allocation of resources to adaptation and mitigation.

While we know -- or at least I would posit -- that a policy based entirely on adaptation is flawed, similarly an emphasis strictly on mitigation is flawed. There needs to be some mix. But exactly what that mix needs to be, and the timing of that mix, remains to be better understood.

Furthermore, we need to understand better the most likely mechanisms by which to generate the resources needed to support the move away from fossil fuels. This is a very

contentious issue, but this ultimately is about technological innovation.

How technological innovation is driven, or led, within our culture depends a lot upon where the resources come from.

Finally, there needs to be an appropriate response to uncertainly itself. I think the Integrated Energy Report is, in its own way, the institutionalization of adaptive management in the energy sector.

But we need to think more about the, I would say -- failsafe if you will -- ways of dealing with the irreducible uncertainty that we already have. Insurance, redundancy in energy systems, and reserves.

So in conclusion, and in anticipation of presentations by my colleagues, I would like to thank the Commissioners for providing, making the time on this agenda to deal with this important issue, and for grappling with exactly how a prudent society should deal with issues as fundamental as its effect on climate. Thank you.

MS. ALLEN: Thank you, Mr. Greenwood. Next we have a presentation from Air Resource Board staff on their work on greenhouse gas

emission sources and climate change.

This is Nehzat, and Nehzat, I still haven't practiced enough with your name. So if you could repeat it for the audience and the Court Reporter? Okay, the Court Reporter would appreciate a card or a specific spelling, too, at your convenience.

Nehzat is with the Air Resources Board's Research Division, working on their greenhouse gas activities.

MR. MOTALLEBI: Thank you. Good afternoon. My name is Nehzat Motallebi. In this presentation I will discuss the greenhouse effect, and present an overview of the evidence for global warming. I will cover some of the possible impacts of climate changes on California.

Next I will explain how human activities contribute to the greenhouse effect. And lastly I will discuss the effort that ARB is undertaking to improve the model source nitrous oxide, hydrofluorocarbon, and black carbon emissions eventually.

This slide shows how the percents of the greenhouse gases, like carbon dioxide, methane, and nitrous oxide in our atmosphere keep the air

surface temperature at a hospitable 60 degrees fahrenheit. Without the greenhouse effect the average temperature would be about five degrees fahrenheit.

Thus, the naturally occurring greenhouse effect makes the earth a more pleasant environment for us and life in general. Anthropogenic processes had a relatively small effect on the atmosphere until the industrial revolution.

Since industrial revolution, human activities dramatically changed the composition of the atmosphere. Combustion of the fossil fuel produces large amounts of carbon dioxide as well as other pollutants. Many of these pollutants absorb infrared energy that would otherwise be reflected from the Earth, thereby heating the surrounding area.

This slide shows the concentration of carbon dioxide in the atmosphere has risen approximately 25 percent since pre-industrial ties and is continuing to increase by approximately one-half percent per year.

Human activities have also increased atmospheric concentrations of other greenhouse gases such as methane and nitrous oxide. Over the

past 100 years, methane concentrations have doubled while nitrous oxide levels have risen about 15 percent.

Analysis of ice core records indicates that current atmospheric levels of carbon dioxide are the highest of the past 160,000 years and shows a close correlation between the concentration of greenhouse gases in the atmosphere and global temperatures.

As you can see in this figure, the immediate past shows a dramatic increase in CO2 concentration in the atmosphere and a corresponding increase in temperature. While the evidence for global warming is overwhelming, it's impossible to predict exactly how it will affect California's ecosystems and economy.

However, there are many areas of concern. As the average temperature of the earth increases due to increased concentrations of greenhouse gases, meteorology will probably be affected. This would almost certainly affect precipitation patterns in California. Melting of polar ice has already led to a rise in sea level.

These basic physical changes would impact California's public health, economy and

ecology. Projected climate change may impact California's public health through changes in air quality, the number of weather-related deaths, and a possible increase in infectious diseases.

Agriculture is especially vulnerable to regional climate changes, such as altered temperatures and rainfall patterns, and new pest problems that could result from climate changes.

Increased temperature can contribute to ground level ozone, which is damaging to many plants. Climate change would also affect forest ecosystems in ways that increase fire hazards and that make forests more susceptible to pests and diseases.

The increasing population in California's coastal areas means that climate change impacts, such as sea level rise and increased storm surges, would impact a large number of people.

One area of considerable concern is the effect of global climate change on California's water supply. In California, each winter, at the high elevations of the Sierra nevada, snow accumulates in a deep pack, preserving much of California's water supply in cold storage.

However, if winter temperatures were warm, more of the precipitation would fall as rain instead of snow. A heavier rainfall burden in the winter will result in higher flood risks. Spring warming causes snowmelt runoff, mostly during April to July.

Less spring runoff will reduce the amount of water available for hydroelectric power production and agricultural irrigation. Throughout the 20th century, annual April to July spring runoff in the Sierra Nevada has been decreasing.

This decreased runoff was especially evident after mid century, since then the water runoff has declined by about ten percent.

Another predicted outcome of global warming is a rise in sea level. This has already been observed in California as is illustrated on this slide, using San Francisco as an example.

California has already seen a seven inch rise in 50 years and the present Delta system may not be viable with a eight to 12 foot sea level rise.

Sea level rise and storm surges could lead to flooding of low-lying property, loss of

coastal wetlands, erosion of cliffs and beaches, saltwater contamination of drinking water, and impacts on roads, causeways, and bridges.

Changes in weather patterns can also influence the frequency of meteorological conditions favorable to the development of high pollutant concentrations. Extreme weather conditions are expected to increase over the coming years.

An overall warming trend has been recorded since the late 19th century with the most rapid warming occurring over the past two decades. The ten warmest years of the last century all occurred within the last 5 years.

There is also a direct relationship between ambient air temperature and the secondary production of ozone. High temperatures, strong sunlight, and a stable air mass create the ideal conditions for ozone formation.

Higher temperatures cause an increase in emissions -- more fuel evaporates, engines work harder, and demand on power plants increase. Air pollution is also made worse by increases in natural hydrocarbon emissions during hot weather.

As the temperature rises and air quality

diminishes, heat related health problems also increase. Unfortunately, human activities can intensify the greenhouse effect because many human activities produce greenhouses gases.

For example, when we burn fossil fuels such as oil, coal, and natural gas for energy to power our cars, homes and factories, it produces carbon dioxide. While carbon dioxide is the greenhouse gas emitted in the largest quantity, other greenhouse gases such as methane, nitrous oxide, and hydrofluorocarbons also contribute to the problem.

Carbon dioxide dominates the total greenhouse gas emissions in California. California has been able to reduce its per capita carbon dioxide emission rate by about 8.6 percent, from 13.2 tons of carbon dioxide equivalent per person in 1990 dow to 12.4 tons of carbon dioxide equivalent per person in 1999.

This slide shows that the California emissions per capita and emissions per dollar are somewhat lower than the national average due to the use of less polluting energy sources, such as natural gas, to run our power plants. We also have a favorable climate that decreases the

heating demand and there are fewer high energy industries in California than in other states.

In the international arena, California emissions per dollar of gross state product are much lower than U.S. emissions per dollar of gross domestic product, but as shown in this slide are comparable with several western European countries.

Now I will discuss the efforts that ARB are undertaking to improve the model source nitrous oxide, hydrofluorocarbon or HFC's for short, and black carbon emission inventory.

Assembly Bill 1493 requires the ARB to develop greenhouse gas standards for vehicles in model year 2009 and beyond. AB 1493 refers to greenhouse gases, including carbon dioxide, methane, hydrofluorocarbons and nitrous oxide.

These four identified global climate change pollutants are clearly associated with motor vehicle use in California. Black carbon and criteria pollutant emissions from motor vehicles are known to have global climate change impacts.

Although these pollutants are not specifically defined as greenhouse gases in AB 1493, the authority to regulate these pollutants

currently exists in the Health and Safety code. AB 1493 does not limit that authority, rather it supports the need to address the impacts of these pollutants.

As mentioned earlier, N2O emissions are explicitly included in AB 1493. At present, there are limited data available on N2O emissions from light-duty vehicles, thus, the ARB is collecting additional N2O emission data to improve our mobile source M2O emissions inventory.

ARB's preliminary N2O emissions inventory is based on a sample of about 40 light-duty vehicles tested at the ARB's Haagen-Smit Lab in El Monte, California. While this database is one of the largest available, we are currently including additional vehicle test results to this database to improve both our emissions inventory, as well as our understanding of N2O emissions from light duty vehicles.

In particular, we are including more late model vehicles, as well as vehicles that will be utilizing forward-looking technologies, such as advanced catalytic converter designs, that are expected to be used by vehicle manufacturers to meet the more stringent NOx emissions standards.

In order to improve our existing database, we have begun a vehicle testing project at the ARB's Haagen-Smit Lab. The project team includes staff from ARB and UCLA, and Professor Arthur Winer acts as the principle investigator.

The test vehicles are largely drawn from vehicles procured as part of the ARB's Vehicle Surveillance Project, supplemented by new and prototype vehicles, obtained from rental fleets and vehicle manufacturers, respectively.

The prototype vehicles will permit ARB staff to investigate the impact on the N2O emissions inventory of the vehicles that have not yet entered the in-use fleet. N2O emissions are being measured using FTIR methods.

In addition to N2O, we also collect species typically collected in ARB surveillance projects such as hydrocarbons, methane, carbon monoxide, oxides of nitrogen, and carbon dioxide. The composition of the test fleet reflects both in-use fleets of California vehicles, including passenger cars, sport utility vehicles, and light-duty trucks, as well as new and prototype vehicles.

N2O data collection has begun in spring

2003 and will continue through fall 2003. The data analysis will be ongoing throughout the project to support AB 1493 and the development of the Staff Report.

Now I will discuss HFC emissions. Hydrofluorocarbon emissions are also included explicitly in AB 1493 bill. However, HFC emissions are less well characterized that N2O.

For HFC emissions, two sources of HFC emissions should be considered. Emissions leaking from nominally closed vehicle air conditioning system, and emissions that are released when the air conditioning system is opened for servicing at someplace other than a professional service shop.

HFC emissions can also occur when the vehicle is scrapped at the end of its useful life. R-134a, also known as HFC-134a, is presently the vehicle refrigerant of choice among vehicle manufacturers. Very little work has been done to measure greenhouse gas emissions resulting from mobile source air conditioning systems.

The small amount of work that has been completed includes a project summarized in the Environmental Science and Technology paper published last year.

In this study, Ford Motor Company researchers conducted a two day test in an enclosure known as a "SHED" on 28 vehicles ranging from model year 1997 to 2000. The tested vehicles ranged from small cars to large pickups.

The results of the test revealed a wide range of HFC-134a leakage rates with a large standard deviation. Results revealed a positive correlation between vehicle mileage and leakage rates.

One caveat is that the SHED tests did not include air conditioning operation and AC operation could significantly affect leakage rates. No measurements of servicing or disposal HFC emissions was performed.

Another approach to estimate HFC emission is by collecting survey data. In 2000 the Mobile Air Conditioning Society conducted a field survey of service garages to estimate the amount of HFC-134a that is lost during normal vehicle operation.

Results revealed that one third of the vehicles surveyed had no charge at the time of service. The rest had a full or nearly full charge. The measurement techniques and

instrumentation were not extremely accurate.

A field survey of service garages was recently conducted in Germany. Usable voluntary garage service records were collected for 678 vehicles that came in for air conditioning repair and recharges. All vehicles were less than eight years of age.

On average, the HFC-134a charge was depleted by 64 percent on the serviced vehicles. There will be an effort to estimate annual HFC emissions in the state from in-use leakage from cooling systems.

ARB will receive data as it comes in to the Mobile Air Conditioning Society from their 2003 shop survey. Certain commercial air conditioning repair shops around the country will collect data on vehicles that appeared this summer for air conditioning service.

Most importantly, we will get data on the age of vehicles needing recharges of R-134a and the amounts they require. Also, several fleet operators who do their own air conditioning repairs will give us similar information.

This data will let us relate amounts of R-134a needed over specific populations of

vehicles. Meanwhile, all Cal-EPA employees who are the original owners of R-134a vehicles will be asked to report how often they have needed recharges.

ARB will also use a SHED evaporative emissions test cell to measure emissions from about 30 in-use vehicles. This will provide some information on leak rates versus model year, air conditioning on/off, nd ambient temperature. We intend to estimate lifetime emissions from a typical vehicle from these data sources plus information about the handling of refrigerant when a vehicle is scrapped.

MS. ALLEN: Doctor, we're running a little low on the time.

MR. MOTALLEBI: Okay. I'll try to move on quickly.

MS. ALLEN: Thank you.

MR. MOTALLEBI: Now I will discuss black carbon emissions. In contrast to greenhouse gases, which have a warming effect, aerosols can influence both sides of the energy balance. Particulate sulfates, organics, and nitrates are estimated to exert a global cooling effect.

However, black carbon from combustion

sources can also absorb radiation, thereby warming the atmosphere. Recent studies have attributed significant global warming to black carbon particles released from diesel and gasoline engines.

Therefore, the ARB is planning to prepare a mobile source black carbon emissions inventory. Emission inventories of black carbon developed to date have focused on industrial,utility, and residential combustion sources.

On a global basis, residential emissions represent the largest source of black carbon. In the U.S., however, it has been estimated that off- and on-road diesel engines are major black carbon sources, making up 36 percent of total black carbon emissions. Gasoline vehicles represent a small but non-negligible source of black carbon emissions.

Compared to much of the U.S., California's generally temperate climate lessens the need for home heating and very little coal is used by California's utilities and industry. Thus, onroad and offroad mobile sources likely contribute to significant black carbon emissions

in this state.

Many studies have been done showing that motor vehicles are a significant source of fine carbonaceous particle emissions. For example, Professor Rob Harley's team at UC Berkeley measured gas and particle phase pollutant concentrations in the Caldecott Tunnel in San Francisco.

In two studies, Dr. Norbeck of CE-CERT tested PM emissions rates from 50 gasoline-fueled vehicles and 19 diesel passenger vehicles. In 1996 a Caltech team led by Professor Glen Cass quantified gas and particle organic compounds present in the tailpipe emissions from an in-use fleet.

Of particular interest because it includes the most recent model years is work by Professor Michael Kleeman of UC Davis. He recently conducted a PM source sampling of light-duty vehicles at ARB's Haagen-Smit Lab. Newer vehicles, model year 1999 to 2002, were included in test fleet.

ARB staff have developed preliminary estimates for black carbon emissions from passenger vehicles. ARB staff will continue to

review the results from existing and on-going studies to develop improved PM emissions rates from light-duty gasoline and diesel vehicles.

The PM speciation data will be used to estimate motor vehicle emissions of black carbon and other PM constituents with climate change potential. The physical processes by which black carbon and other aerosols affect global climate change are very complex.

Thus, to estimate the radiative forcing impacts of motor vehicle PM emissions it's necessary to use global climate model. ARB is sponsoring a research project with Caltech that will apply a global climate model to estimate the relative climate forcing of CO2, black carbon, sulfate, nitrate, and organic particles emissions from different motor vehicle fleets on both short and long time scales.

Caltech will complete it's global climate model simulation by January 2004, and data to support AB 1493 will be available in the spring of 2004. The development of the greenhouse gas inventory to support AB 1493 will include establishing a model year 2000 baseline inventory for light-duty onroad motor vehicles and also an

inventory for future model years.

These inventories will be used for calculation of benefits, award of credits for early compliance, and analysis of alternative strategies.

ARB will sponsor several workshops to present staff's concepts for the greenhouse gas inventory, including scope of the inventory, status of current emission inventory development, and proposed timeline for the inventory processes. The next inventory workshop will be in September 2003.

In summary, both regional and global climate changes are occurring in response to human activities. The possibility of significant climate change resulting from human activity is arguably the most challenging and complex environmental issue facing the world today.

Projected climate change will impact California's air, public health, and environmental by influencing the production of smog, distribution of pollutants, and amount of pollution that remains in the air. Assembly Bill 1493 is an exciting step toward minimizing the impact of light-duty vehicles on global warming.

Now that the bill has become law, our job is to take general framework set forth in the bill and fill in the blanks with a thoughtful, reasonable program that takes advantage of available technology. This concludes my presentation, and I would be happy to answer any questions.

MS. ALLEN: Thank you, Nezhat. There will be an opportunity for questions and comments at the end of the next presentation, when there will be an informal discussion opportunity for the entire group.

Our final presentation is by Gerry Bemis, who has been introduced already. He'll be talking about the Energy Commission's work on greenhouse gases from the -- well, it's clear that I am taken by surprise by this new presentation. Is it loading in? Okay.

MR. BEMIS: I'll cover the Energy Commission's programs very quickly.

MS. ALLEN: All right. While that's loading in, please keep in mind that today's discussion of greenhouse gases is primarily from the emissions perspective. There have been other workshops that have covered greenhouse gases as it

relates to hydro changes, and then from the energy efficiency perspective.

So greenhouse gases are spread throughout the IEPR workshop process.

While we're continuing the loading process I'll introduce Pierre duVAir, who is the manager of the Energy Commission's Greenhouse Gas Program and Climate Change Program.

MR. DUVAIR: Thank you, Eileen. Good afternoon. My name is Pierre duVair, and I am with the Energy Commission's Climate Change Program. I'm going to talk very quickly to some of the programs that we have here at the Energy Commission that are related to climate change.

We've got a number of different groups within the Energy Commission that deal with climate change issues. The Energy Commission started working on climate change back in 1988 when we were directed by some legislation by Senator Sher that asked us to look at the potential impacts of climate change on California.

Our very first staff report was produced back in October of 1990 that created the first greenhouse gas emissions inventory for the statewide sources of greenhouse gas emissions.

And we then came out with a report in 1991 that summarized some of the potential effects of climate change on California's economy and environment and some policy recommendations. The legislation by Senator Sher in 2000 directed the Resource Agency to create a nonprofit voluntary greenhouse gas emissions Registry.

That Registry is now up and running, has about 30 new organizations that are just beginning to utilize some protocols that were developed by the Registry to quantify sort of the greenhouse gas footprint of all these organizations in California.

The Energy Commission is one, and Cal-EPA is another that have volunteered to join this registry. This legislation, SB 1771, also directed the state and the registry to develop a process for approving third-party certifiers and technical advisors to this Registry.

Participants in the Registry will report direct emissions and certain indirect emissions of greenhouse gases. CO2 is mandatory in the first three years. Other Kyoto gases will kick in after three years.

This is fairly unique greenhouse gas

emissions inventory. There's one or two other states that have voluntary registries starting up. And then of course we have the federal greenhouse registry that's been up and running since about 1994.

The state has agreed to stand behind the greenhouse gas emissions reported at this Registry, when they're certified according to the protocols developed by the Registry and a third-party certifier that's been approved by the state and the Registry.

And the state will provide appropriate consideration for early greenhouse gas reductions in any future regulatory scheme that's developed related to greenhouse gas emissions.

1771 also directed the Energy Commission to update its statewide greenhouse gas emissions inventory. We recently completed that for a look at the 1990's, and the Energy Commission has been directed to update that statewide inventory every five years to develop trends in greenhouse gas emissions to try and explain how energy and air policies are influencing the trends in greenhouse gas emissions.

The Commission was directed to convene

an interagency task force and a climate change advisory committee in this legislation. There has been a multi-agency team that has been meeting for about two years. It's now directed by Greg Greenwood of the Resources Agency.

A lot of technical staff from many agencies that have interest in climate change have been meeting, identifying what the state is currently doing and what more the state could do to both mitigate greenhouse gas emissions and to better adapt for the imminent types of changes that climate change will bring to California.

We have an energy technology export program here at the Commission. They try to assist small and midsize California companies to -- they're very interested in looking into ways to utilize the emerging greenhouse gas markets.

The financial benefits that can be associated with carbon reductions, and find ways that they can use that as a mechanism to finance both energy efficiency and renewable energy technology projects.

They focus on clean power technology, efficiency, and renewables. And the areas of concentration of this program right now are Asia

and Latin America.

Here's some examples of the types of projects that the Energy Commission's export program has been involved with. In renewable they're looking at windpower projects and geothermal, methane recovery and power generation.

Energy efficiency -- they've got projects in Thailand and Mexico that help California businesses work with these countries to either improve energy efficiency or implement renewable energy sources. We have a big R&D program here on climate change.

In 1996 we had the Public Interest Energy Research Program created. One focus of that is climate change research. Their efforts are to improve the understanding of climates science -- both the environmental and economic impacts.

And to develop some tools that will help the state better evaluate ways to mitigate greenhouse gas emissions and develop adaptive strategies.

A number of projects that have been funded by PIER relate to climate change. A $2 million project with EPRI and other state agencies

to look at the impacts in a number of sectors in California. The update inventory was funded through PIER, and then just a range of other projects.

Currently the PIER R&D program for climate change is about $5 million a year. There's climate science focused at Scripps. There's some climate policy and economics at Berkeley. A carbon sequestration program and project that's being developed, and then a grant program.

Legislation that was passed last summer -- Senate Bill 812 -- directs the Energy Commission to work with Department of Forestry and the Registry to develop some very difficult protocols for quantifying changes in forest carbon related to management practices.

I think Greg Greenwood related a little bit to the potential for California's forests and soil to store more carbon, but the accounting protocols are going to be fairly difficult in that arena.

The legislation was requiring sort of permanent dedication in that any types of forestry activities be additional to what's required by

law.

We passed a renewable portfolio standard. This will have some effects on California' greenhouse gas emissions. It requires 20 percent of retail sales to be provided by renewables by 2017. Electrical corporations are to increase their sales by one percent a year until they reach that total.

Assembly Bill 2076 you've heard a little bit about. That's ways that California can reduce its dependence on petroleum. There are some forecasts that were produced for petroleum demand out to 2010 and 2020.

This is a joint CEC and Air Board effort, and they have developed some statewide goals for reducing demand in petroleum fuels. Largely it was designed to address fuel price volatility and rising fuel demand and limited state refining capacity. And they're very close to finishing that work.

There are a range of strategies that were evaluated, that all will have greenhouse gas emissions benefits. Any type of displacement of fossil fuels will lead to greenhouse gas emissions reductions.

And then, of course, you hear a little bit about the Pavley bill. The Energy Commission is going to be working with the Air Board and the Registry has a role in that in terms of developing protocols for providing credits to early actors for vehicle greenhouse gas emission reductions.

And then finally here's some internet resources. This presentation will be out on a desk out in front for those that are interested.

And then, finally, in summary, California has a number of policies, legislation and programs to reduce greenhouse gas emissions. You've heard about the ARB's program. The Energy Commission has a number of programs in this arena.

We're largely focused on energy efficiency and new technologies are going to be really important to achieve what Greg Greenwood described as the switch away from fossil fuels.

We're going to be increasing our renewable energy sources, and we're certainly going to be trying to promote CO2 sequestration through some crediting of forced actions. That's it.

MS. ALLEN: Thank you, Pierre. Pierre, for the presentation that you just gave, does it

have a cover like this? What is the title? Is Gerry making this one? Okay.

Who's next? You or Gerry? All right. Gerry Bemis, who's already been introduced, will be making a presentation on emission trends associated with greenhouse gases.

MR. BEMIS: For those of you who haven't found it, my presentation looks like this. It's two slides per table. It's on top of the big table out in front.

Wow. We've heard a lot of what Air Resources Board is doing, and all those wonderful things, and all the wonderful things Pierre's doing. This will be a sort of a brief summary of what we have done, looking at emissions specifically.

Nehzat mentioned the need for a lot of new data on emission factors, to get a better understanding of what the emissions are from all these exotics that lead to global climate change. But, lacking all that information, our PIER program folks pressed on, and developed at least a preliminary inventory that was our best assessment of what the emissions inventory is.

And my purpose right now is to walk you

through that emissions inventory. We don't need data, we just charge ahead. What's it look like?

This is a graphic summary, starting in 1990 and going out to 1999. The middle blue lines are carbon dioxide emissions. The purple line is methane emissions. Nitrous oxide, N2O, is the light yellow. And the green are HFC's, PFC's, and SO6.

We also inventoried some amount of sinks of carbon sequestering, and that's shown in the darker yellow line down below the axis. Just for your information, these are adjusted into million metric tons of carbon dioxide equivalents.

And the equivalents are carbon dioxide as one, methane is 21, nitrous oxide is 310, the HFC's, PFC's, and SO6's are on the order of 1,300 to 11,700. And those are all for 100 years of global warming forcing potential.

You can see that the warming potential is largely carbon, and I think the next slide shows that it's 84 percent carbon dioxide. The next largest is -- this is for that last year, in that bar chart, 1999 -- and it shows carbon dioxide at 84 percent, methane at eight, nitrous oxide at around six, and hydrofluorocarbons at

around two.

So by far the biggest contribution in terms of CO2 equivalents is carbon dioxide. We can see the major sources for these various fractions are fossil fuel combustion for carbon dioxide, methane is a combination of fossil fuels, landfills and agriculture operations. N2O, nitrous oxide, is agriculture and automobiles. And hydrofluorocarbons are refrigerants and solvents.

Now, what's it look like in the net, where I've incorporated the sequestering or the sinks into the bars -- before they were shown separately.

And you can see the trend here is essentially flat, at around 400, with minor dips and bobbles. But given the accuracy of our information, it looks like a flat line to me.

This is in spite of the fact that our economy has grown since 1990, our vehicle miles travelled has grown since 1990, and our economy has overall expanded since 1990. So the per capita emissions are in fact decreasing, as we said earlier.

Take that top line now, and break it

down into fuel type. The bottom area is gasoline, and it's pretty flat. The diesel consumption is also pretty flat. And you can see electric utilities in this graph, the medium level area, is gradually declining over time.

And the other is about half of the overall carbon dioxide equivalents emissions. That's industrial processes and things like that, so just lime and cement manufacturing, etc.

What's it look like in a pie chart. Again, 58 percent is from transportation, the next highest contribution, on this chart anyway, for CO2 only -- not for total, just for CO2 -- 16 percent, industrial 13, residential 9 and then commercial four percent.

The previous chart was for all global warming gases, this one's for carbon dioxide, in case you're confused by the differences. And thank you ARB for loaning me those.

This graph shows our historical consumption since 1990, and projected out through the year 2020. Similar to what I showed earlier today. Gasoline and diesel consumption. And it shows that both gasoline and diesel consumption are rising and expected to continue to do so, with

gasoline rising at a faster rate.

So if you think back to the area chart I showed before, where gasoline and diesel make up roughly half of the total global warming gas emissions, this suggests increasing contributions from those sectors, depending upon how the rate of growth in those other sectors.

I wish I had an inventory projection of all the global warming gases projected out through at least 2020, but I don't. And this is subject for future work. So I'm looking forward to getting improved emission factors from ARB.

And brief, concluding remarks. Gasoline and diesel demand continue to grow, as that last chart showed. Transportation's contribution to greenhouse gas emissions will likewise grow without some form of regulatory action.

CEC intends to work with ARB in a cooperative effort to develop and update inventories, especially projected greenhouse gas emissions. And ARB rulemaking should lead to a reduction in greenhouse gas emissions as we talked about with the Pavley bill.

We don't know how far they're going to go yet, but those trends that I showed in the

previous chart will be offset by whatever mitigation measures are in fact adopted by the Air Resources board for implementation in the year 2009, as was mentioned earlier. And that's it.

MS. ALLEN: Thank you. Our final presentation will be a second item by Pierre duVair, and this is the efforts to improve the understanding of greenhouse gas emissions and climate change.

There is a handout on the table, and it has this same kind of cover and it says "efforts" on it.

MR. DUVAIR: Good afternoon again. Pierre duVair with the Energy Commission Climate Change Program. I've just a few slides here to talk about some of the efforts that are underway to help California better understand the greenhouse gas emissions within the state of California.

We've heard a little bit from the Air Board about a lot of their research efforts to better understand greenhouse gas emissions in the mobile source sector.

There's been a -- well, I showed a slide a bit earlier about this joint agency climate

team. That's been a group of technical staff from a number of agencies that are trying to identify a whole host of activities that the state can undertake to both mitigate greenhouse gas emissions and better adapt.

One of the areas that that group's been looking at is ways to improve our understanding of greenhouse gas emissions within California. A greenhouse gas emission inventory really is a basic tool for us to be able to identify how effective programs are at reducing particular sources of greenhouse gas emissions within the state.

Unfortunately, a lot of the sources that we've heard, particularly the non-CO2 sources, need quite a bit of additional research and development in terms of sort of universally agreed or standardized techniques for quantification.

The statewide greenhouse gas emission inventory -- while ours is fairly well advanced compared to a lot of other state agencies, and we've put a fair amount of resources into the three versions of statewide inventory that we've done here in California -- there's still a lot of work that can be done in terms of improving both

the data that feed into a statewide inventory and the techniques that are available to quantify emissions.

Currently we have, as I said, three statewide inventories. One in '91, one that was completed in '97, and then a recent update that has emissions statewide through 1999. Forestry and land use change is probably the most significant area for better understanding California's anthropogenic greenhouse gas emissions, and SB 812 will help us identify a more standardized approach to this.

The PIER program is funding work through Winrock International in terms of coming up with a standardized approach for statewide forest carbon accounting protocol. And then we'll be working with the Registry and the California Department of Forestry to come up with protocols for project-based reporting for greenhouse gas emissions in the forestry sector.

But a lot more effort is needed in this arena. And then also our California Department of Food and Ag is very interested -- and many of their constituents are very interested -- in soil carbon storage, and opportunities to participate

in carbon markets due to additional storage of carbon in California soils.

There's a number of actions that we can take here in California to improve our inventory. The first step would be to identify where the large uncertainties are with different emission sources, identifying potential new sources, and then prioritizing, coming up with ways to improve the quantification procedures for these sources.

We need to expand existing data collection and information in particular at local level. And many local governments are beginning efforts to conduct their own greenhouse gas emissions inventories.

A few additional measures -- we can work with federal agencies that do gather information and find ways that we can improve statewide estimates within a lot of the databases collected by the federal agencies.

We currently are working with refineries in terms of additional information from them about fuel cells and distribution companies and state and local agencies are really going to be key to improving our statewide estimate of emissions.

Right now we largely rely upon fuel

sales for estimating greenhouse gas emissions from fossil fuel consumption. We need to work with airports and marine ports in particular to develop an approach to estimating fuel consumed for domestic travel in particular, but international travel as well.

And the difficulties in separating out emissions from those two sources is significant shortcoming right now in the statewide inventory.

We need to improve estimation of fuel that's consumed for production of petrochemicals. There's a range of these types of particular sources of information that we don't have right now that additional information can help us get a much better estimate of statewide emissions.

And then the non-CO2 gases is a key area, where we need to better identify the sources and quantify emission trends over time, and those are the most significantly rising sources of greenhouse gas emissions. Also with a much higher global warming potential.

And finally, we need to work to standardize these approaches to quantifying greenhouse gas emissions. There's efforts internationally to try and standardize these

through the Kyoto Protocol and clean development mechanisms.

And those types of arenas are working to come up with approaches that standardize greenhouse gas accounting. We have the California Registry that we'll work with to try and do the same out here.

We need to develop techniques that in particular are able to assign greenhouse gas emissions to consumption of electricity here in California. And then we need to enhance our ability to monitor the emerging carbon trading markets, and those are evolving fairly rapidly internationally and beginning to develop here in the U.S.

And finally we need to coordinate and partner with local governments. We need to improve these inventories, balancing key criteria -- reasonable costs and then appropriate level of accuracy that allow us to detect the effect of individual policies.

In summary, a standardized, appropriately accurate, transparent and affordable method for accounting for greenhouse gas emissions is really vital to the state's ability to assess

the effectiveness of policies that are going to be directed towards greenhouse gas mitigation.

And then California needs to increase its coordination with local governments, other states, federal and international organizations, all working to develop universally accepted approaches to greenhouse gas accounting.

MS. ALLEN: Thank you, Pierre. Now we're at the point where this is an opportunity for informal discussion on greenhouse gas topics among all the participants. Any comments from the Commissioners or questions from the speakers?

CHAIRMAN BOYD: The only question I have is, Pierre, you put on the table more or less the question about inventory. And I'm just wondering, in a 2003 Integrated Energy Policy Report, how much of a policy issue is the question of inventory?

I mean, I agree with the idea that it's absolutely necessary to have one. It's important to do all the coordinating things you mentioned and what-have-you, but I'm struggling with knowing how big of a problem we have here in California, or do we really have a problem?

MR. DUVAIR: I would have to agree.

It's probably not a policy call. I mean, we heard earlier that there are different databases related to emissions -- both criteria and I'm sure greenhouse gas emissions.

The Air Resources Board takes a different approach to quantifying greenhouse gas emissions, a more bottoms up, based on the fleet composition. We based ours, the statewide, on fuel sales.

There's room, I think, and potentially there are some policy calls, about whether we feel one approach might be more appropriate. There is international and federal guidance on how nations and states are supposed to conduct their greenhouse gas emissions inventories. I think that we're most interested in ways to improve the accuracy of them. I doubt that there are any significant policy calls, as you've identified.

I think we just need to work together to identify where the priorities are for dedicating additional resources towards improvements on the different sources of greenhouse gas emissions, but not any significant policy calls.

MR. SCHEIBLE: From our perspective, when you get into the areas under 1493 to provide

flexibility, to provide equivalent determinations, then it gets to be fairly important that we know if someone's reducing HFC's, how much it is, and what kind of credit that gets versus CO2 reduction versus N2O.

So from the global what's the problem look like, it's a far easier scheme than okay, you've got to create a credit scheme that allows people to gain equivalence credit for alternative reduction.

CHAIRMAN KEESE: You introduced a new aspect there. Commissioner Boyd was being simple, at least for me, saying what we have to do in the inventorying category. I mean, is inventorying a policy issue that should be incorporated into our report? And I think that's a simple question.

The next question is should California targets for global climate change be in our report? And I've heard some references that were pretty broad brush as we went through this -- as I've heard it in discussions. Have we adopted a target?

When we talk about change, I agree. There is clearly an impact from change. But have we decided that the climate of Mexico, which is

warm, or the United States, which is moderate, or Canada, which is cold, is the best, and that's what we want to go for?

When you start detailing these little things, are we -- should we deal with change being bad in this report? Or should we decide that we want to go back to 1900, when we were at -- or let's say the 1500's to 1900 when, as I recorded, we were at 280 CO2, 750 methane, and 270 NOx.

Is that perfect, is that what the target should be? Do we have to adopt a target before we want to decide what we're going to put into our Integrated Energy POlicy Report?

MR. SCHEIBLE: I think, the direction that we see coming out of the legislation in 1493 is in the transportation sector, at least the light-duty area, what we've been provided as direction, is to figure out what to do to minimize the emission of global warming gases through at least technological options in california's light-duty fleet and use of transportation fuels.

I think a policy issue would be for the Energy Commission to say -- as a similar policy for all other aspects of energy advisable also -- tt's not so much what the final target is, it's

we're going in the wrong direction and we need to change course and go there less slowly or reverse it.

What can we do and how fast can we do it, to set an example.

CHAIRMAN KEESE: In other words, the base that we have from 1500 to 1900 is better than seeing something change?

MR. GALLENSTEIN: Well, I don't think it's so much change. Change is unavoidable. And change is already engaged in the climate system. I think it's more a question of being prudent in our driving of the climate, particularly into arenas that we really have not encountered in the last 15, 20,000 years.

When you look at the historical record, there are a number of -- over a long period of time, glacial and interglacial periods. And we've bounced back and forth from basically our current temperature down about seven degrees in the glacial periods and then back up.

And we've gone through numerous of those cycles over the last 50 to 100,000 years. What we're seeing is we're now at the top end of that cycle and now we're kicking the system up even

higher.

I don't think climate scientists really know what's going to happen in that arena. Will there be a new cycle established? I really don't think we know.

To some degree it makes me think of should you play around with your cholesterol? You know it ought to be running in a certain range.

When you start overdosing on the transfatty acids and you start seeing your cholesterol going through the roof the question is not so much the perfect target of cholesterol that you need to have to prevent your heart attack, but you know you're going in the wrong direction.

You have to turn around and head in the other direction. Now, to me, the real question is the rate at which one does that. What it costs to do that, when measured against the other aspects of generation of wealth and maintenance of other aspects of the economy.

I wouldn't cast this as one in which we know what the perfect climate is. I would cast this as more of a question of do we feel like we're headed in the right long-term direction, and if we're not, how do we start sort of turning this

aircraft carrier of an economy based on fossil carbon in a different direction.

CHAIRMAN KEESE: Okay. I start from the point of being a believer. Now, in our report, how should we incorporate this. What is the target that we're going to suggest for the state of California?

In our policy report, when we integrate all our energy, what should we -- I can see the first, we've been given two here. You know, we should get better inventory. We should reduce the impact of automobiles. Are we going to go beyond that? Are we going to say that --?

MR. GALLENSTEIN: Okay. Well, I didn't come prepared with a list of policies to plug in to the report, however --

CHAIRMAN KEESE: That's where you need to end up.

MR. GALLENSTEIN: I agree, that's where you need to end up. The one thing that --

CHAIRMAN BOYD: In the first place, I wish we'd differentiate between targets and maybe goals. As Dr. Greenwood knows, there is a body politic out there that wants to set targets. And that's a debate one has to have in cap and trade

versus registries.

And then there are just goals which the state of California should pursue separate and apart from should we be coerced into adopting a target like other states and countries have. To me, there are two different questions on the table.

MR. GALLENSTEIN: I guess -- one thing that I've seen that I think is worth at least considering, is in the AB 2076 analysis there was a number put -- I believe it was, what, ten or 15 dollars a ton for CO2?

I mean, we don't know what the right number is that kind of encapsulates the complete costs of ongoing emission of CO2. But the ability to put thta number into the economic calculus seems to me to be an important step forward.

I don't offer that as a sufficient policy, but it's an indication that, from here on out, when we do economic analysis of the various options in front of us, having a number associated with this particular stream of emissions -- heretofore which we had not done -- seems to me to be an important thing to get into our calculations.

MS. ALLEN: This is an opportunity for members of the audience to ask questions for clarification, or make comments.

CHAIRMAN BOYD: Either they know the answers or they are as confused as we are.

MS. ALLEN: It's a thoughtful topic. Complicated, too. Go ahead. Please come to the microphone for purposes of the Court Reporter, and identify yourself for us.

MR. DOYLE: Good afternoon. My name is Stephen Doyle. I'm the President of Clean Energy Systems, Inc., which is a small business here in Sacramento. Approaching the power industry with trepidation, we've developed a new technology, and I'll tell you a few things about it.

And I will conclude with a couple of recommendations for your report. But I want to say a few things as background for my recommendations.

First of all, we all know that we have a problem. And we know that the industry brought to that problem, over the last 20 to 30 years, a number of solutions that looked like they would help -- the renewables. We can make power cleaner, and we can make power in ways that don't

affect the environment significantly, using things like solar cells, wind turbines, etc.

And these renewables were found to be desirable things to do, and therefore the legislature said let us encourage the industry to use these technologies as tools of power generation by assigning tax ctredits.

And so for specific periods of time these renewables have been given certain tax credit status in order to encourage the industry to implement them. All wise policy, in my view.

Now John Beyer, this morning, one of the Commission staff people, got up and said a few words about technology. And I heard what he said but I didn't hear it land anywhere. And my concern is that the committee may be building a magnificent three-legged stool, and forgetting one of the legs.

I think your report has to rest on three firm legs. One is the work you have been doing, and have done -- collecting data, establishing baselines, and determining progress against the baselines. Are we going away, are we going up, are we going down, are we making any difference over time. And that data assimilation and

analysis is very important.

Secondly, you have looked at the trends of how things are going, and what is driving those trends. You've looked at the technology, the policies, and the implementation practices under the laws -- federal and state -- that have led certain things to happen.

But the thing that I'm not hearing at all is what's going to happen tomorrow. And it seems to me the report is very heavily oriented for retrospective analysis, because it's convenient and you have a lot of factual data.

But when you look to the future, you're not saying anything. And what I want to encourage you to do is to take a little bit of gumption, and say some things need to be done that haven't been done yet and could be done. There is new technology out there.

I heard someone say today that we've done as much as we can do to clean up power plants, and by 2005 we will have implemented all the available technology know-how we have. And as new power plants are built, the curve of emissions is going to start up again. Wrong. That isn't going to happen.

And it isn't going to happen because of companies like the one I represent, and other companies that are out there, building technologies for people that will allow us to take fossil fuel, combust them, make power, and have zero emissions to the atmosphere.

We've demonstrated technologies to do that. There are technologies available now to be implemented that can do that. And yet there doesn't seem to be any awareness of those technologies, because the industry, by and large, wants to keep selling gas turbines forever.

And that's not a good practice. So I encourage you to consider whether or not there shouldn't be some more said about the future technology potentials, and even possibly conduct a workshop looking to what is down the road.

I don't want you to go down the road ten years, I don't want you to go down the road 20 years, I want you to go down the road two or three years. What can we expect to change, in the technology base of our industry, that could have a significant impact on our problem.

And I don't hear any of that, so that's distressing to me. We can build power plants

today that will have zero emissions and that will burn fossil fuel.

We can take a coal plant, gasify that coal -- with zero emissions -- and take the syn gas from the coal and burn it with zero emissions, and produce electricity and give you no effluent in the atmosphere. The technology exists.

This Commission, the California Energy Commission, has helped fund its development. The National Energy Technology Laboratory in Pittsburg, DOE, has also helped fund that technology. And it's now being built into a power plant which will be up and running by this time next year. So we'll see it in operation.

But it's there, it's not a technology that needs to come. So, --

MS. ALLEN: Where will that power plant be?

MR. DOYLE: Pardon?

MS. ALLEN: Where will that power plant be located?

MR. DOYLE: It will be either at the Contra Costa plant in Antioch, which is owned by Merint (sp), and they are a cosponsor, along with the California Energy Comission, to build that

plant.

Or, if Merint should dispose of that location, there is an alternate location in the Bakersfield area that we are looking at, which would be to recoup a closed biomass plant, and bring it back on line with our gas generator technology, which would allow us to reopen the plant with zero emissions.

It was closed down by the EPA because the boiler was putting out too much particulate matter. So there are alternatives available, and we will be deomonstrationg them in the near future.

My point simply is you need to talk a little bit about the future, and the tools coming available. Now we presented our technology to the Air Resources Board about a year and a half ago. We were received with great interest.

And they made some very clear statements. When you have a technology that is demonstrable, represents a product, that product has a known life, a known system life cost, and we can project what it would cost to require the industry to use that technology, come back and see us. Because then we're talking about something

that's real, we're not talking about a concept on paper.

And that's a very valid position for the Air Resources Board. But I don't think the Air Resources Board, or the California Energy Commission, should ignore the availability of the technology -- which the Commission itself is funding to be demonstrated -- and not put it in a report of this kind.

So I recommend two small paragraphs in your report that goes forth to the legislature at the end of your process.

Paragraph one, I think you ought to encourage the legislature to consider establishing tax credits for fossil fuel zero emission combustion systems comparable to what they offer for renewables. If we can find ways, and demonstrate ways, to use fossil fuels with zero emissions, we ought to be encouraging the industry to look toward that technology.

And one way to do it is by implementing tax credits. The second recommendation I have is to recommend either that you be authorized, or that the collective agencies in the power industry be authorized to do, a technology assessment as

part of your policy survey, and build that third leg to stick on the stool.

And look at least three years into the future on potential emerging significant technologies that can be taken into account in your projections that go out five years, ten years, 15 years.

Because a technology that's within three years has got to be pretty near in hand, it's got to be pretty well demonstrated to go into a power plant and be online in three years.

So I would say that it would be safe to recommend a technology assessment paragraph or section in your report that looks at least three years into the future and says what's out there that we know is coming that's being funded and is likely to be online within the next three to five years, and can influence the problems we're addressing.

So those are my two recommendations -- consider tax credits for zero emission fossil fuel plants, and consider adding a little more emphasis on future technology which is nearly emerging. Thank you.

MS. GRIFFIN: If I could respond. I'm

Karen Griffin, I'm the program manager for this IEPR. I can assure you that we are incorporating looking at new technologies in part of this report.

All of the public interst energy strategies, all of the roadmaps, are part of the IEPR. And they're actually just being considered in as yet another piece of this very huge proceeding.

But we definitely are looking at both technologies that are coming online, and identifying gaps through this process that we can go to the PIER people and say "this is where we need research."

So your comments -- we are incorporating them, and we're glad that you share our concerns about what's important.

CHAIRMAN KEESE: And I would comment -- I elicited some answers here from the ARB this morning which were consistent with what you said. That rather than saying that two parts per million, enough is enough, or one part per million, enough is enough, the ARB's target is zero.

So you are emphasizing, again, what they

said. Zero is the target. And we're not going to say you should get a tax credit based on how low you are below one part per million. Your suggesting it should be for some strategy that is zero.

CHAIRMAN BOYD: Let me say that I, for one, have never given up on technology. The ever-accelerating pace thereof, I hope. So I agree with your comments, and I appreciate your comments.

And Karen, I just wanted to ask a question, whether this Thursday's workshop, which is billed as energy system futures, involves technology at all. Or whether it's not quite in the technology forum?

MS. GRIFFIN: No, the systems futures is really not a technology workshop.

CHAIRMAN BOYD: I didn't think so.

MS. GRIFFIN: It's really a local area focus group activity, where we're bringing in people from across the state to give us a public view of their concerns about the various visions of the energy future that will be presented in the morning session.

CHAIRMAN BOYD: Thank you.

MS. ALLEN: Other comments and questions? Well, moving right in to Part Four of the agenda. This is an opportunity to make any other comments. Mr. Doyle basically commented on presentations from the morning. So, if there are any other comments, please bring them forward.

Also, all of you and the greater audience in the energy community and the air quality communities, have the opportunity to comment. Al, what is the deadline for accepting written comments?

MR. ALVARADO: Well, I was suggesting comments on any of the subject matter for this workshop and the next several that we're going to encounter this next several weeks. And this would give us enough time to sort of digest a lot of the comments that we may be receiving and prepare the draft Electricity and Natural Gas Report.

CHAIRMAN BOYD: I guess you're in charge.

MS. ALLEN: If only I had this much power for the rest of my waking hours. Hearing no other comments, this concludes the IEPR air quality, public health and energy workshop. Thank you all very much for coming, and thank you very

much to the participant speakers. We appreciate all the thoughts that have come forward.

(Thereupon, at 3:49, the workshop was adjourned.)

CERTIFICATE OF REPORTER

I, ALAN MEADE, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 20th day of June, 2003.